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SHOUT
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IT

A Well-kept Yellow Transparent Apple Orchard in Delaware, about 10 Years Old.

U. S. DEPARTMENT OF AGRICULTURE.
BUREAU OF PLANT INDUSTRY—BULLETIN NO. 194.
B. T. GALLOWAY, *Chief of Bureau.*

SUMMER APPLES IN THE MIDDLE ATLANTIC STATES.

BY

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POMOLOGIST IN CHARGE OF FRUIT DISTRICT INVESTIGATIONS.

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LETTER OF TRANSMITTAL.

U. S. Department of Agriculture,
Bureau of Plant Industry,
Office of the Chief,
Washington, D. C., July 25, 1910.

Sir: I have the honor to transmit herewith a manuscript entitled "Summer Apples in the Middle Atlantic States" and to recommend that it be published as Bulletin No. 194 of the series of this Bureau. This bulletin was prepared by Mr. H. P. Gould, Pomologist in Charge of Fruit District Investigations, and is coordinate in character with Bulletin No. 135 of the Bureau series, entitled "Orchard Fruits in the Piedmont and Blue Ridge Regions of Virginia and the South Atlantic States." It has been submitted by Mr. A. V. Stubenrauch, Expert Acting in Charge of Field Investigations in Pomology, with a view to its publication.

The information contained in this bulletin results from a systematic investigation which is now in progress by this Bureau in different fruit-growing regions of the country. The object of this work is to determine as far as possible the adaptability of fruit varieties to different conditions and the particular climatic and other requirements of different varieties.

The growing importance of early-apple culture and the increasing demand for fruit of this character have warranted the giving of special attention to this phase of fruit growing. In certain sections of the region referred to in this bulletin early-apple culture is of great importance not only because of its present degree of profitableness, but because of the fact that it has developed largely in the place of a declining peach industry.

While the varietal data and other information are based on the conditions which exist in this region and hence are not directly applicable elsewhere, it is expected that fruit growers in other regions who may be interested in the growing of summer apples will find the discussions of value to them.

The writer wishes to acknowledge his indebtedness to the many fruit growers in this region who have without reserve given him the freedom of their orchards and the benefits of their experience in the

course of the field work connected with these investigations. The assistance of his office associates in the identification of varieties and in other ways has also aided the writer very materially in the preparation of this bulletin.

Respectfully,

WM. A. TAYLOR,
Acting Chief of Bureau.

Hon. JAMES WILSON,
Secretary of Agriculture.

CONTENTS.

	Page.
Introduction	7
Description of the Coastal Plain region	8
Geographical location	8
Topography and elevation	10
Soil	10
Climate	11
The summer-apple industry of this region	16
Development	16
Present status and extent	17
Natural advantages and possibilities of this region for summer-apple production	18
Growing the fruit	19
Handling the fruit	19
Methods and conditions	19
Harvesting	20
Grading and packing	20
Packages	21
Methods of selling the fruit	21
Markets and the place held by summer apples	22
The problem of varieties	22
Considerations governing selection	22
Discussion of important varieties	23
Promising varieties for trial	49
Other varieties	50
Summary of varieties	51
Phenological records	53
Character of data	53
Phenological observers	54
Description of plates	90
Index	91

ILLUSTRATIONS.

PLATES.

Page.

PLATE I. A well-kept Yellow Transparent apple orchard in Delaware, about 10 years old ..... Frontispiece.

II. Wagons and packages used in handling summer apples. Fig. 1.—Wagon loaded with half-bushel baskets of summer apples grown in New Jersey for the Philadelphia market. Fig. 2.—Wagon loaded with ⅞-bushel baskets of summer apples grown in Delaware, ready to be hauled to the shipping station 90

III. Packing-house views in Delaware. Fig. 1.—Exterior view of a packing house. Fig. 2.—Interior view of a packing house, showing a common method of handling the fruit in grading and packing summer apples 90

IV. Typical summer-apple orchards. Fig. 1.—A Maiden Blush orchard in New Jersey, about 30 years old. Fig. 2.—A Red Astrachan orchard in Delaware, about 25 years old 90

TEXT FIGURES.

FIG. 1. Map of the Middle and Southern Atlantic States, showing the location and extent of the regions discussed in this bulletin 9

2. An Early Ripe apple tree in Delaware, about 15 years old 29

3. An Early Strawberry apple tree in Delaware, about 50 years old 30

4. A July apple tree in Delaware, 12 years old 35

5. A Starr apple tree in New Jersey, 8 years old 43

6. A Summer Hagloe apple tree in New Jersey, 48 years old 44

7. A Williams apple tree in Delaware, about 10 years old 47

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SUMMER APPLES IN THE MIDDLE ATLANTIC STATES.

INTRODUCTION.

The extensive and systematic growing of early-ripening or "summer" varieties of apples for commercial purposes is one of the comparatively recent developments of the fruit industry. Such varieties have always had a place in the family orchard, and in seasons of abundant crops the fruit from these trees has often been sold in the local markets. Occasional commercial orchards, since the early days of the fruit industry, have contained a few trees of early varieties, the fruit of which has been shipped by express or otherwise to more or less distant markets, but in most commercial apple-growing sections early varieties have not been considered worth including in extensive fruit-growing projects. In some sections, however, during the past ten or twenty years, and especially during the last decade, the attention of fruit growers has been directed more and more to the possibilities in this direction.

A considerable demand has developed for summer apples. This demand is growing; new markets are being reached. During the past few seasons fruit growers and shippers have received an increasing number of requests from commission houses and fruit dealers for fruit of this class. Though this demand may in a measure be variously influenced from year to year by the abundance of peaches and other fruit in the market during the early-apple season, it shows an increasing appreciation of the important place which summer apples may be made to fill.

In the Middle Atlantic States, and especially in the Coastal Plain or "tidewater" region, there are several sections in which the growing of summer apples has already become an important feature of fruit growing. This phase of the fruit industry has been greatly extended here in recent years and is being still further developed. It is believed that other sections of these States, where little or no fruit is now grown, are also capable of being developed along this line. This bulletin describes the region mentioned—its conditions, advantages, and possibilities in relation to the production of early apples—and contains

a discussion of the principal varieties now grown there, with a view to indicating their relative value in the further development of the early-apple industry in this region.

DESCRIPTION OF THE COASTAL PLAIN REGION.

On account of the relative importance of the early-apple industry in the Coastal Plain region, in comparison with other sections in the Middle Atlantic States, it is a matter of convenience to adopt this region as a geographical unit of territory in this bulletin and to base comparisons and discussions on the observations made there. Its location and extent are indicated below.

GEOGRAPHICAL LOCATION.

In a general way, the division line in the Middle Atlantic States between the region commonly termed the Coastal Plain and the adjacent territory is indicated on the map shown as figure 1 by a conspicuous unbroken line. This line may be said to start in New Jersey at the mouth of the Raritan River where it empties into the bay of that name, extending in a southwesterly direction to Trenton. The Delaware River forms the division between New Jersey and Pennsylvania south of Trenton. The dividing line then continues in a southwesterly direction across northern Delaware and the eastern shore of Maryland, passing in the vicinity of Chestertown. Crossing the Chesapeake Bay, it reaches Anne Arundel County a few miles north of Annapolis and continues in the same direction to the District of Columbia. In Virginia the direction of this boundary is slightly southwest from Alexandria to the vicinity of Fredericksburg and includes a narrow strip of land along the Potomac River between these two cities. From the latter a southerly direction is followed, passing near Richmond and Emporia. A southwesterly direction is followed in crossing North Carolina, passing near Raleigh and reaching the South Carolina line at a point nearly south of Rockingham, the county seat of Richmond County, N. C. In the same arbitrary way the state line between North and South Carolina is taken as the southern limit of the region under discussion.

From a purely geographical standpoint the corresponding area of South Carolina and Georgia should be included in this unit of territory, but as practically no apples are grown in these sections they are not specifically included in the present discussion. And further, it is generally conceded that these sections are not well adapted to apple culture on account of the climatic conditions which result from their low elevation and low latitude.

It is believed, however, that the development of the early-apple industry is practicable in that part of the area of the Middle Atlantic States which lies between the Coastal Plain and the 500-foot contour

(this being largely an arbitrary boundary line). The approximate position of this contour is indicated on the map (fig. 1) by a broken line. The conditions of this section are such that the discussions

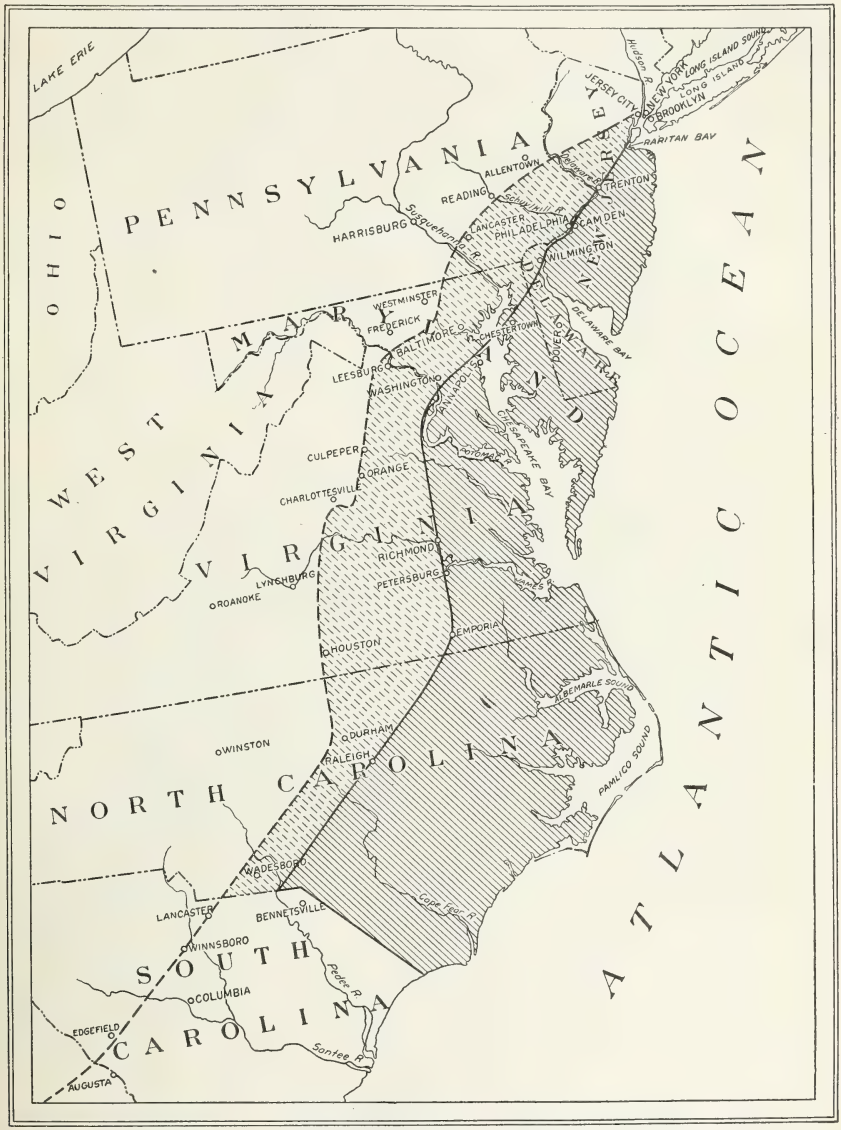

FIG. 1.—Map of the Middle and Southern Atlantic States, showing the location and extent of the regions discussed in this bulletin. The Coastal Plain is shown on the map by continuous lines, the inland boundary being to some extent arbitrary. The region between the Coastal Plain and the approximate course of the 500-foot contour is shown by broken lines.

which follow, though based on the Coastal Plain, would doubtless be applicable, with only minor modifications, to this area.

TOPOGRAPHY AND ELEVATION.

The topography of the Coastal Plain is unmarked by any special characteristics. The surface is generally level, rising slightly and gradually from the coast westward. A large number of rivers and smaller streams and their tributaries traverse the region in their course to the sea. They constitute an important factor in the soil drainage.

The elevation above sea level is comparatively slight, a large proportion of the region being less than 100 feet. Most of the remaining portions have considerably less than 200 feet elevation.

While the relative and actual elevations are practically identical and only a few feet, comparatively, above sea level, the character of the soil and subsoil and the natural water drainage provided by the streams which flow through this region insure as a rule good soil drainage. The atmospheric drainage is not so perfect as it is in regions where there is an alternation of ridges and valleys with considerable differences in relative elevations.

SOIL.

While several types of soil are represented in the Coastal Plain, the extreme characteristics of the different types which need to be considered in the present connection are not wide in so far as they have a bearing on commercial orcharding. In fact, it is evident that the influence of different methods of management in orchards located on the same type of soil could be made to exert decidedly more influence upon the behavior of varieties than would any inherent differences in the types themselves.

A large proportion of the soil is a light sand to sandy loam. The subsoil underlying much of this is of the same general character as the surface. In places, the subsoil is slightly heavier, having a small content of clay.

Small areas exist where there is sufficient clay in the surface to make a light clay loam, but it is very easily pulverized when cultivated. The subsoil of this is also heavier than that underlying the lighter types, but it is not compact. Small sections having this type of soil contain more or less gravel, from a quarter of an inch to an inch in diameter. This soil is somewhat "stronger" than the more sandy types.

Several other types might be distinguished by drawing very fine distinctions, but it is sufficient for the present purpose to consider them as variations of those already mentioned. Generally speaking, the soil is free from rocks and is easily worked.

The characteristics of the subsoil which have been described are known to extend to a great depth in many instances, as shown by wells and other excavations.

While these soils may not contain as large a supply of reserve plant food as some other types they are generally productive. Their physical properties are such as to favor deep penetration by the roots of growing plants, thus giving the plants a relatively large feeding area. The soil also responds readily to the application of commercial plant foods. It may be said in comparison with the average growth made by trees in other apple-growing sections that in the more important sections of this region they develop a good amount of wood growth and are relatively long lived.

The capillarity of the soil is strong, and the character of the subsoil makes it a deep reservoir for the storing of moisture. While this may pass off readily through surface evaporation under some conditions, it can be largely conserved by thorough cultivation. It is seldom that crops suffer more from lack of moisture here, under proper management, than in other sections having a similar amount of precipitation but more compact types of soil.

CLIMATE.

The climate of a place affects the plant life growing therein in many ways. In some one or more of its elements it is the most potent determinant of plant growth. Climate is an exceedingly complex influence, and the numerous combinations of the factors which constitute it render its effect upon plant life difficult in the extreme to interpret.

Each of these factors, as it is manifested in the climate of a place, acts in a particular way upon the varieties of apples, as of other forms of plant life, which may be grown there. The manner in which a variety responds to the influence of these factors, singly or in combination with one another, determines what the effect of the climate is upon that variety, and therefore its relative adaptability to particular purposes in that region so far as the climatic factor is concerned.

In its influence upon vegetation of all kinds, climate may be resolved into a number of elements of which the following are the most important:[a]

(1) Precipitation (rain and snow).
(2) Temperature (from day to day, and the mean).
(3) Extremes of heat and cold.
(4) Time and frequency of frost.
(5) Amount and intensity of sunshine.
(6) Humidity and transparency of the atmosphere.
(7) Direction and velocity of wind.
(8) Perhaps the electrification of the atmosphere.

It will thus be seen that climate is more than a matter of temperature and moisture, as popularly applied, though these factors are

[a] See Encyclopedia Americana, under "Climate."

doubtless the most potent of any in their effects upon plant growth. It is not intended, however, within the limits of this paper to discuss at length what these effects are, even if it were possible to do so. There is an unfortunate lack of adequate means for measuring some of these elements, which doubtless are of great importance, and of interpreting them in terms of their influence upon plant life. Records of precipitation and temperature are abundant, but they seldom represent actual orchard conditions, being taken usually at points more or less distant from fruit plantations and often with instruments attached to buildings many feet above the surface of the ground. This is true, at least, of many of the records which are continuous for any considerable period of time.

In general it may be stated that in order for a plant or a variety to succeed without irrigation there must be sufficient precipitation to maintain growth adequate to the end for which the plant is intended. As regards temperature, the extremes must be within certain more or less definite limits, and the mean, especially for the more critical periods in the life of the plant, must accord with the particular requirements of each individual. The mere matter of late spring frosts—an unfavorable extreme at a critical period—may indicate the impossibility of successfully growing certain fruits in some localities.

As applied to the region now being considered, it is sufficient to state that with certain general exceptions, noted elsewhere, the climatic conditions are favorable for the cultivation of early apples in most sections of the region. The orchards now in bearing testify to this fact. The extremes of temperature in most parts of the region are not severe, the precipitation is usually sufficient to meet the requirements, and the other climatic factors in most sections are equally favorable to the end in view.

The following tables, taken from the Monthly Weather Review for the years 1902 to 1907, inclusive, are composed of climatological records at three different stations located respectively in the southern, central, and northern sections of this region. They represent to some extent the climatic conditions which prevailed during the years mentioned and furnish one of the best available means for comparing the climate of this region with that of other sections where similar data are to be had. Such a comparison should assist in correctly forecasting for other sections the behavior of the varieties considered, so far as the climatic factors are concerned. These climatological data are also inserted for use in connection with the phenological records that appear on later pages.

As will be noted, the following table gives the monthly maximum, minimum, and mean temperatures and the precipitation. The geographical arrangement of the stations as they appear in the tables is from south to north.

TABLE I.—*Records of temperature and precipitation for Kinston, N. C., Seaford, Del., and Moorestown, N. J., for the years 1902 to 1907, inclusive.*

Place and month.	1902.				1903.			
	Temperature.			Precipitation.	Temperature.			Precipitation.
	Maximum.	Minimum.	Mean.		Maximum.	Minimum.	Mean.	
Kinston, N. C., elevation, 46 feet. (United States Geological Survey):	°F.	°F.	°F.	Inches.	°F.	°F.	°F.	Inches.
January	73	15	41.3	1.01	71	18	43.0	2.96
February	76	19	38.4	6.70	74	16	48.4	5.91
March	83	22	54.9	3.04	81	34	60.0	8.05
April	89	30	61.2	2.34	86	30	56.7	2.99
May	97	44	72.8	2.64	95	45	67.6	3.91
June	100	50	77.5	3.92	90	51	.....	.....
July	104	60	82.6	2.69	97	60	79.4	8.07
August	99	52	78.6	8.91	97	62	79.6	6.93
September	91	46	72.6	2.76	88	41	71.5	.89
October	84	31	62.9	5.13	86	27	57.4	3.28
November	81	31	57.2	4.14	71	14	.....	.60
December	71	16	45.5	1.82	61	15	36.2	1.99
	.....	.....	.....	45.10	.....	.....	.....	[a] 45.58
	1904.				1905.			
January	67	10	35.6	4.12	76	11	40.2	0.85
February	75	17	38.2	4.10	65	15	38.1	5.06
March	79	27	51.8	5.04	88	25	56.6	2.52
April	88	28	58.6	.82	90	29	61.2	4.06
May	93	43	68.8	3.78	92	49	73.0	5.57
June	99	51	77.6	1.29	96	49	77.2	3.90
July	101	62	80.4	5.00	98	62	79.4	4.38
August	98	57	78.2	3.58	99	53	77.2	4.22
September	90	44	71.6	4.75	96	45	74.2	1.70
October	86	33	59.7	1.73	92	33	62.4	3.12
November	72	24	48.6	2.30	80	23	52.1	1.58
December	69	20	41.0	2.82	70	20	45.2	4.75
	.....	.....	.....	39.33	.....	.....	.....	41.71
	1906.				1907.			
January	79	21	48.0	3.68	80	17	51.4	1.13
February	74	17	44.1	4.63	72	9	42.6	2.39
March	80	22	50.4	7.53	98	25	59.2	2.39
April	94	30	63.8	.52	83	28	54.6	4.05
May	98	37	70.0	3.41	95	40	68.7	5.56
June	100	61	78.8	4.37	98	49	73.4	9.07
July	100	64	79.2	9.16	102	58	81.3	9.11
August	96	67	81.5	13.08	96	58	78.6	5.02
September	96	57	78.0	.59	97	51	77.0	3.83
October	87	28	64.4	4.13	93	29	59.0	.89
November	85	22	52.3	.84	79	25	51.2	3.19
December	77	17	46.7	1.34	79	19	46.0	3.08
	.....	.....	.....	53.28	.....	.....	.....	49.71

[a] This total covers eleven months only.

TABLE I.—*Records of temperature and precipitation for Kinston, N. C., Seaford, Del., and Moorestown, N. J., for the years 1902 to 1907, inclusive*—Continued.

Place and month.	1902.				1903.			
	Temperature.			Precipitation.	Temperature.			Precipitation.
	Maximum.	Minimum.	Mean.		Maximum.	Minimum.	Mean.	
Seaford, Del., elevation, 40 feet. (Estimated):	°F.	°F.	°F.	Inches.	°F.	°F.	°F.	Inches.
January	52	12	32.0	3.73	56	12	34.3	3.46
February	62	8	30.0	5.01	69	6	38.4	6.90
March	75	20	47.1	2.98	76	25	51.1	5.67
April	87	31	53.5	3.79	86	28	52.6	3.98
May	88	40	64.6	2.29	91	37	64.6	2.51
June	96	50	72.8	6.86	88	50	66.6	3.46
July	100	57	78.1	5.55	100	52	76.0	3.91
August	93	52	73.8	1.69	96	56	73.4	4.38
September	89	45	68.6	5.91	89	37	67.5	4.15
October	79	31	60.2	4.23	83	32	57.5	8.44
November	74	30	53.2	3.16	79	17	42.6	1.71
December	63	17	37.0	4.79	54	11	31.8	3.70
				49.99				52.27
	1904.				1905.			
January	62	2	29.2	1.73	60	− 4	29.8	4.48
February	59	3	28.5	2.32	50	− 2	26.8	3.83
March	68	19	41.2	3.39	77	19	44.8	2.20
April	77	26	48.4	1.95	81	27	62.2	2.89
May	82	41	62.2	1.52	82	40	63.4	5.50
June	94	44	69.5	2.02	89	45	69.2	4.02
July	94	54	73.5	7.74	95	57	74.4	6.73
August	88	49	71.4	1.32	89	53	72.2	5.69
September	90	35	66.6	2.08	82	40	66.7	6.19
October	83	29	52.6	2.73	80	31	57.0	1.45
November	66	21	42.4	2.01	72	16	44.6	.66
December	60	2	30.4	6.07	62	17	38.3	4.58
				34.88				48.22
	1906.				1907.			
January	73	7	40.7	2.53	71	8	37.8	2.53
February	60	9	34.8	4.61	54	5	29.4	2.60
March	61	15	38.4	5.88	88	19	46.6	2.72
April	84	27	53.0	1.44	79	23	47.1	3.90
May	92	33	63.0	4.86	84	36	58.0	6.97
June	92	55	71.4	12.30	87	46	65.0	4.50
July	89	57	73.2	11.56	91	55	74.8	3.92
August	91	64	75.6	7.86	91	52	71.8	2.46
September	91	51	70.8	2.28	90	40	69.1	3.95
October	76	30	57.0	4.70	76	30	51.7	3.06
November	68	27	45.4	1.45	64	28	45.4	5.62
December	62	12	37.5	3.45	62	20	39.3	3.65
				62.92				45.88

TABLE I.—*Records of temperature and precipitation for Kinston, N. C., Seaford, Del., and Moorestown, N. J., for the years 1902 to 1907, inclusive*—Continued.

Place and month.	1902.				1903.			
	Temperature.			Precipitation.	Temperature.			Precipitation.
	Maximum.	Minimum.	Mean.		Maximum.	Minimum.	Mean.	
Moorestown, N. J., elevation, 71 feet. (Weather Bureau):	°F.	°F.	°F.	*Inches.*	°F.	°F.	°F.	*Inches.*
January	53	11	29.8	2.95	53	9	31.8	3.69
February	57	9	28.0	6.45	68	0	34.6	4.71
March	75	19	45.3	4.22	76	24	48.8	5.28
April	87	31	51.4	3.63	90	28	51.6	5.33
May	87	38	61.2	2.45	93	31	64.2	.44
June	91	48	68.3	7.30	85	45	65.0	5.65
July	92	55	73.6	7.05	94	50	73.4	5.44
August	88	49	70.6	8.44	92	49	69.2	5.49
September	87	43	65.4	5.29	88	36	65.8	4.42
October	76	27	56.7	7.59	80	31	57.0	8.79
November	76	27	50.4	2.50	73	14	41.4	1.18
December	60	12	32.9	7.34	54	9	30.0	4.48
	.....	.....	.....	65.21	.....	.....	.....	54.90
	1904.				1905.			
January	56	− 9	24.0	3.02	54	0	27.7	2.87
February	59	0	25.6	2.40	45	− 1	24.2	2.79
March	68	15	38.4	3.83	81	9	41.0	4.24
April	79	25	48.2	2.61	80	26	50.8	3.12
May	92	40	63.6	3.23	84	34	62.2	1.31
June	94	46	69.0	3.07	91	45	68.9	2.93
July	92	52	72.4	5.69	96	55	75.2	2.85
August	89	48	71.1	7.08	90	50	71.6	5.66
September	88	32	65.8	5.84	84	37	66.0	3.81
October	84	25	52.6	4.00	87	29	56.3	3.84
November	63	18	40.9	2.04	67	15	42.7	1.87
December	53	1	27.0	2.93	61	15	36.6	3.59
	.....	.....	.....	45.74	.....	.....	.....	38.88
	1906.				1907.			
January	72	5	37.2	2.85	67	0	32.6	2.93
February	61	4	32.2	2.06	48	0	24.1	2.86
March	58	13	35.4	5.37	86	11	42.0	2.66
April	81	26	52.4	2.71	79	23	46.0	3.68
May	90	35	62.1	2.66	85	32	55.8	5.34
June	92	48	71.5	7.33	91	41	64.8	6.85
July	90	53	73.8	4.11	90	53	73.3	4.45
August	92	62	75.2	9.43	90	51	69.8	6.48
September	89	45	69.2	3.99	88	39	67.4	6.74
October	75	29	55.1	4.20	76	26	50.8	3.89
November	68	22	44.2	1.70	62	21	43.8	5.49
December	65	8	34.2	3.34	62	17	37.2	4.25
	.....	.....	.....	49.75	.....	.....	.....	55.62

The following data regarding the occurrence of spring frosts at various points in this region are of particular value when considered with the blossoming dates that constitute a part of the phenological data given on later pages. These data have been furnished by the United States Weather Bureau.

TABLE II.—*Average dates of the latest spring frosts at different localities in the Middle Atlantic States.*

Location.	Average date of latest frost.	Date of latest frost recorded.	Number of years recorded.
Central and Southern New Jersey:			
Asbury Park	Apr. 19	May 29	11
Moorestown	Apr. 23	May 15	41
Vineland	Apr. 17	May 22	36
Atlantic City	Apr. 11	Apr. 25	20
Chesapeake peninsula:			
Chestertown, Md	Apr. 19	May 11	10
Easton, Md	Apr. 12	Apr. 28	11
Millsboro, Del	Apr. 17	Apr. 30	14
Princess Anne, Md	Apr. 23	May 12	10
Maryland, west of Chesapeake Bay:			
Baltimore	Apr. 4	May 3	33
Laurel	Apr. 21	May 11	10
College Park	Apr. 29	May 12	10
Solomons	Apr. 8	Apr. 27	11
District of Columbia:			
Washington	Apr. 7	May 11	37
Virginia:			
Warsaw	Apr. 14	Apr. 28	11
Hampton	Mar. 27	Apr. 6	11
Norfolk	...do.....	Apr. 26	33

THE SUMMER-APPLE INDUSTRY OF THIS REGION.

DEVELOPMENT.

In the sections of this region where there now exist large summer-apple interests, there were formerly very extensive peach orchards. The summer-apple industry, as a commercial feature, has been developed largely since the destruction of many of the peach orchards by yellows. In fact, apple culture has to some extent taken the place of peach growing, many apple orchards now occupying land formerly devoted to peaches.

Some of the United States census figures relating to the peach interests of Delaware and New Jersey are of interest in this connection. Unfortunately these figures are not given in sufficient detail prior to the census for 1890 to admit of any comparison, but those for the year named and for 1900 stating the number of peach trees of bearing age in the States mentioned show the trend during that decade, as follows:

	1890.	1900.
Delaware	4,521,623	2,441,650
New Jersey	4,413,568	2,746,607

Similar data for Kent County, Del., are also suggestive, since very heavy plantings of peaches formerly existed in this county, and at

the present time it is the center of the most extensive summer-apple interests of any section in this region.

Census data relating to apples in this section are of little significance, as they include the trees of bearing age of all seasons of ripening, and many fall and winter sorts are grown as well as summer varieties, yet the recent extension of apple culture, especially in Kent County, Del., has been quite largely of early varieties. Data regarding the number of peach and apple trees of bearing age in this county are therefore of interest for comparison with the data as to peach trees just presented, as follows:

	1890.	1900.
Peach trees	2,335,740	824,430
Apple trees	114,371	186,457

The period of most rapid extension of the early-apple interests, however, has been during the past eight or ten years; hence, it is not shown in any available census figures.

PRESENT STATUS AND EXTENT.

A general statement as to the distribution of the orchards in this region, giving the more important centers of early-apple production, will give the reader some conception of the extent and importance of this phase of fruit culture.

In New Jersey, the principal early-apple interests are within a radius of 18 to 20 miles of Philadelphia. Large quantities of fruit are grown in this section, nearly all of which is hauled in wagons to the Philadelphia markets. A common type of wagon used for this purpose is shown in Plate II, figure 1.

There are numerous other orchards in central and southern New Jersey in which early apples are an important factor, but they are considerably isolated in their location with regard to one another, and the fruit from them is handled quite differently from that which is grown near Philadelphia.

In Delaware the important section is the central part of the State, the commercial orchards being well distributed over Kent County within a distance of 8 or 10 miles of the railroad.

In the other sections of Delaware, and in the Maryland, Virginia, and North Carolina sections of this region, early apples are grown in much the same way that they are in southern New Jersey. Family orchards and many gardens contain such varieties, and occasionally isolated orchards of commercial size are to be found, but the industry is not centralized in particular sections, though in the aggregate the amount of fruit grown is considerable.

In the sections of this region where the fruit interests have already been well developed a good system of orchard management is gener-

ally practiced. However, in many of the other sections, where fruit growing at present is only a secondary matter, the orchards are generally greatly neglected. Little or no cultivation is given, unless in connection with the growing of interplanted crops; usually no pruning and no spraying. Under these conditions many of the orchards are sorely attacked by insects and fungous diseases. There is no reason to suppose, however, that these difficulties may not be readily overcome by the application of the usual methods in such cases.

With relation to the last statement, however, it should be noted that in the southern section of this region certain fungous diseases of the apple appear to be unusually prevalent, and should any extensive commercial development of apple culture be considered, this feature should have full consideration. However, while the climatic conditions may have some influence in the extent to which these diseases have appeared in the past, it is not assumed that the more common diseases which are now noticeable could not be readily controlled by the use of certain precautions and the application of proper spray mixtures. In fact, a few orchards in this section which have been properly attended to demonstrate that this is the case, especially when varieties adapted to the region are planted.

NATURAL ADVANTAGES AND POSSIBILITIES OF THIS REGION FOR SUMMER-APPLE PRODUCTION.

The extent to which successful summer-apple culture in certain sections of New Jersey and the Chesapeake peninsula has been developed is good evidence of the natural advantages of these sections, but some of the other sections require notice in this connection.

Earliness of maturity is an important consideration, and the light sandy and sandy loam soils, which are characteristic of nearly the entire region, doubtless contribute toward this end. The temperature is usually relatively high during the period when the fruit is making its growth, without which the other factors, however favorable, would fail to produce early ripening.

The location of the region with reference to the larger markets and distributing centers of the East is likewise a favorable factor. The relationship between the points of production and distribution is always an important matter, and especially so in the handling of any quickly perishable product. In case there should be developed in the future a demand in the foreign markets for early apples, the comparatively close proximity of a large portion of this region to the eastern seaports, and the readiness with which the fruit grown therein could be landed on the docks, renders this region particularly adapted from this point of view for the supplying of such demands. Shipping facilities are likewise good. Many points in this region have access

both to rail and water transportation, a condition always considered favorable to the fruit grower.

In general, the climatic conditions are favorable for the end in view. The only exceptions that call for special notice are the late spring frosts and cold periods following unseasonably high temperatures in winter, during which the fruit buds advance to a tender stage. If these unfavorable temperatures occur during the blossoming period, serious damage is likely to result. On account of the low elevation of this region it is more subject to these conditions than regions having higher relative altitudes. In selecting orchard locations, places where late spring frosts are known to occur to a serious extent should be avoided.

GROWING THE FRUIT.

As the subject-matter of this bulletin is primarily a description of the conditions that prevail in the Coastal Plain region and an account of the different varieties of early apples grown therein and their behavior, only passing mention is made of cultural and fruit-handling methods.

In general, it may be said that the orchard management requisite for the production of this class of fruit does not differ materially from the usual methods employed in growing winter apples. The same pruning, cultivating, fertilizing, spraying, etc., are required in the one case as in the other. The later sprayings commonly recommended for late varieties are not so necessary for the earlier sorts for obvious reasons, though the early applications should be made with the same thoroughness that is required for winter sorts. It is a question worthy of consideration, however, whether later applications made after the fruit has been harvested would not be worth while, at least in the case of varieties especially susceptible to fungous diseases, in order to protect the foliage during the long period between harvesting and the end of the season. The vigor and healthfulness of the trees might thus be insured and the crop the following season perhaps improved thereby.

HANDLING THE FRUIT.

METHODS AND CONDITIONS.

The methods employed in handling early apples are much more closely allied to those used in marketing peaches than to the usual manner of caring for winter varieties. This results naturally from the character of the fruit.

As a rule the fruit is intended for immediate consumption and is not usually marketed until fully ripe, or, at least, in suitable condition to use without delay. As its period of duration is short when edible

maturity is reached, it must of necessity be used within a comparatively few days after it is put on the market. Some varieties, however, intended only for cooking, are shipped as soon as they are large enough for this purpose, without much regard to the degree of maturity which they may have reached. Although such varieties may be held longer than those marketed in a thoroughly ripened condition, they soon begin to deteriorate if held for any considerable length of time.

HARVESTING.

In harvesting early apples careful hand picking is practiced by a majority of the most successful growers. A few firm-fleshed varieties, the fruit of which ripens irregularly and drops as soon as it is well colored and fully ripe, are sometimes allowed to drop their fruit. If there is danger of the apples being bruised by striking the ground, a heavy mulch of straw is spread beneath the trees. But many of the most particular growers prefer to hand pick even these sorts, though it is rather laborious to do so on account of the ripe fruits being much scattered over the trees.

Some of the less exacting growers shake the fruit from the trees or beat it off with poles, claiming that the difference in price between the carefully handled fruit and the fruit handled by their method is not enough to justify the extra expense of hand picking. It should be noted, however, in this connection, that careless or rough handling of fruit in harvesting often accompanies indifferent methods of culture. The grade of the fruit grown frequently determines the expense that is justifiable in preparing it for market.

The period of growth from blossoming to maturity is relatively short, and the changes which occur in the development of the fruit take place with corresponding rapidity. It may be only a very short time, as measured by days, between a date when an apple is too immature to pick and the period when it becomes overripe. Because of this, several pickings of most varieties are usually made, as in picking peaches. The specimens which are small and immature when the first picking is made will commonly develop with increased rapidity, attaining a degree of perfection not reached by the more advanced specimens.

GRADING AND PACKING.

In the marketing of early apples the details of grading and packing require the same painstaking attention that the successful marketing of other quickly perishable fruits demand. Fruit that is bruised should be discarded. Though it may not appear to be defective when it is packed, bruises and other similar blemishes, especially in

case of certain varieties, become very conspicuous after the fruit has been picked a short time. Even if it looks well when packed, such fruit is likely to deteriorate greatly before it reaches the market.

Some of the early apples grown in this region are prepared for market in the orchards, but most of them are taken to packing houses, where they can be more conveniently handled. Plate III, figure 1, shows a convenient packing house. The upper portion of the building is used for storing packages, etc. There is a door on each side, thus making it convenient to receive or discharge fruit at any point on the floor. A common method of handling early apples in the packing houses in grading and packing is shown in Plate III, figure 2.

PACKAGES.

Several different styles of packages are used in this region for early apples, of which the following are the most important. In some sections the $\frac{7}{8}$-bushel crate, formerly much used in Delaware for shipping peaches, was commonly used in the earlier years and is still seen occasionally, though it has passed out of general use.

The growers in the New Jersey section who market their fruit in Philadelphia use the half-bushel peach basket, usually without covers. These are shown in Plate II, figure 1. In other important sections a $\frac{7}{8}$-bushel basket with cover has been used for several years with excellent satisfaction. These baskets may be seen on the wagon shown in Plate II, figure 2. This figure also shows the manner in which these packages are loaded for hauling to the shipping station.

A few growers pack their fancy fruit in six-basket carriers and find that for some markets it pays to incur the additional expense which this style of package makes necessary. Twenty-pound Climax baskets are also used occasionally.

METHODS OF SELLING THE FRUIT.

Several methods of selling the early apples grown in this region are practiced. Perhaps the most simple one is that employed by the growers who are located in the New Jersey section within 15 to 20 miles of Philadelphia. The fruit is packed in half-bushel baskets as above mentioned, loaded on large wagons built for the purpose (Pl. II, fig. 1), and hauled directly to the commission houses or other markets. In some cases the grower runs his own stand in the market, perhaps handling truck and other farm produce at the same time. By either of these methods the packages are returned to the grower.

At the more important shipping centers the growers sell f. o. b. as much as possible, thus avoiding all risk in transit and the possi-

bility of loss from poor market conditions. This method makes it possible to ship in car lots, as the buyer fills his cars ordinarily with fruit purchased of different growers.

MARKETS AND THE PLACE HELD BY SUMMER APPLES.

Very naturally, large and relatively near-by distributing centers, such as Philadelphia and New York, receive large quantities of summer apples from this region. To a less extent, some of the New England markets, principally Providence, R. I., and Boston, Mass., receive more or less fruit, especially of certain varieties. During the past few years, however, new and more distant markets have been sought. As a result, considerable quantities of fruit from the Chesapeake peninsula section are shipped to such points as Pittsburg, Pa.; Cincinnati, Ohio; Detroit, Mich.; Chicago, Ill.; and to even other more distant western and northwestern points.

Foreign markets also offer an outlet for considerable quantities of early apples, especially when the European crop is light. The results of the experimental export shipments made by the Bureau of Plant Industry indicate that for fruit of good grade properly handled and when the markets are not overstocked with home-grown fruit, good returns may be expected from London, Liverpool, and some of the other leading foreign markets.

As an important commercial product, summer apples are a comparatively new commodity in many markets and their use has been limited. They have not filled a place comparable with that held by peaches, winter apples, and some other fruits. Hence, in the past the period of real demand for them has usually been during a scarcity of other fruits. There is evidence, however, that a very large number of consumers have now come to think of summer apples as filling a definite place in their food supply. While the demand is naturally more or less influenced by the abundance of other fruit in the markets during the summer-apple season, it is not so much dependent upon the availability of other fruit as in the earlier years and it is becoming more constant as the regularity and abundance of the supply of early apples increases.

THE PROBLEM OF VARIETIES.

CONSIDERATIONS GOVERNING SELECTION.

There are several fundamental features which should always be considered in selecting the varieties of any kind of fruit to be grown in a given region or under particular conditions. The purpose for which it is to be grown, whether dessert or cooking, home consumption or market, should be given due weight. A variety may behave in a certain manner, ripen its fruit during a particular period, and show

other habitual characteristics when growing under a certain combination of conditions of soil, climate, elevation, and cultural methods. When the variety is grown under other combinations of conditions it may behave in a very different manner. In other words, a variety is subject to the influence of the conditions under which it is grown. In those conditions there may be involved both natural factors, such as soil and climate, and factors which are more or less artificial, such as are imposed by man in his methods of culture.

It will now be understood how the subject-matter of the preceding pages has application to the notes which follow regarding the varieties that are being grown in this region. The fact is here emphasized that the statements made in the following discussion of varieties have specific application only to the fruit grown under the conditions that prevail in this region. It is hoped, however, that the information presented regarding existing conditions, and the behavior of the varieties referred to under those conditions, may be of some assistance in selecting varieties for other localities.

In the scope of this bulletin it has been the intention to include only varieties which reach maturity in some section of this region not later than the middle of September.

DISCUSSION OF IMPORTANT VARIETIES.

The following varietal list includes the most important early varieties which are grown in this region, and a considerable number of others which are known only in a limited way. No attempt, except in a few cases, has been made to give a detailed description of the varieties mentioned. Usually a few of the more prominent varietal characteristics are named in order that the reader who is unacquainted with a variety may be able to obtain readily a general idea of its appearance and quality.

Alexander.

This is a very old variety, probably of Russian origin. Its history is briefly indicated in the following:

"The evidence is reliable that Red Astrachan, with Duchess of Oldenburg [Oldenburg] and Alexander, were introduced into England by the Royal Horticultural Society from Sweden, as Russian apples about the year 1816. Wm. Kenrick in his catalogue in 1832 speaks of them as promising. In 1834 The Massachusetts Horticultural Society imported them, adding Tetofsky [Tetofski]. In 1839 the elder Manning of Salem exhibited them as home grown. Since then they have been widely distributed." [a]

The Alexander apple has become quite widely distributed in many parts of the country, though not grown in large quantities. In this region a few trees of it have been found at widely separated points. The tree is a fairly strong grower on the light soil where it has been observed. It comes into bearing quite young, but fruits mostly on alternate years. The fruit is roundish conic; usually large to very large; greenish yellow, heavily striped with red when well colored; acid; quality good; of value primarily for cooking. Its season begins the last of June in eastern North

[a] Letter of Mr. William C. Strong, Waban, Mass., April 2, 1906.

Carolina; in central New Jersey, about one month later. The variety is considered desirable as a commercial sort by some of the growers. In some sections the fruit is inclined to drop prematurely, but this characteristic has not been reported from this region in the present connection.

Bachelor Blush.

This variety is said to be of New Jersey origin, but details of its history are not obtainable. It is not widely disseminated and in this region is known only to a very small number of growers. The rather meager information obtainable concerning its behavior indicates that it may possess considerable merit.

The tree is said to be prolific, bearing more or less fruit annually. The fruit resembles the Maiden Blush apple considerably but is rather larger than that variety; frequently more highly colored and of better dessert quality. In central New Jersey ripening begins the last of August.

Benoni.

This variety originated in Massachusetts many years ago. The first published reference to it appeared in the New England Farmer in 1831. It is growing in a few orchards in central New Jersey and in at least one tide-water orchard in Virginia.

The tree grows with sufficient vigor and bears heavy crops on alternate years, though under some conditions nearly annual crops are produced. The fruit possesses high dessert quality and is of attractive appearance; color yellowish, overspread with red and striped with crimson. It is too small, however, for general commercial purposes, though for a special trade some demand might be created for it on account of its high dessert quality. This also commends it for home use.

In the Virginia orchard, above mentioned, which is located in close proximity to the coast, this variety has done especially well in recent years. The trees bear heavily and the fruit reaches a good size for the variety, obtaining a high degree of perfection. In this orchard good cultural conditions are maintained. The fruit begins ripening early in July in Virginia; in central New Jersey it is two weeks or so later.

Bibbing.

So far as information at present available indicates, this variety was first propagated and distributed in this region sometime prior to 1875, by the late Mr. Randolph Peters, whose nursery was not far from Wilmington, Del. It does not appear, however, to have been planted extensively, as only an occasional orchard in this region now contains it. On account of its very close resemblance to the Oldenburg apple, and the danger of confusion with that variety, attention is here directed to it.

In habit of growth, the tree makes a rather flat, broad top, moderately dense, and with heavy dark-green foliage. In contrast with this habit the top of Oldenburg is usually more roundish and less dense and the foliage somewhat lighter. The fruit of these two varieties is hardly distinguishable one from the other. Bibbing is perhaps less sharply acid and may be slightly earlier than Oldenburg. Otherwise it is scarcely possible to distinguish any constant points of difference between them, and even those noted as distinguishable may be so influenced by conditions as to be of little value for purposes of identification.

Bietigheimer. Synonym: *Red Bietigheimer.*

This variety is of German origin. It is growing in a small number of orchards in central New Jersey and Delaware, both on the very light sandy soils and the more loamy types.

The tree is a fairly vigorous, upright grower under these conditions, but the variety is not proving thus far to be of any special value. It is late in coming into bearing, trees 10 to 15 years old having borne very sparingly. Older trees in other regions indicate that heavy bearing is unusual. Under favorable conditions the fruit is very

large in size; skin yellowish, nearly covered with a pinkish-red blush, often with a more or less marbled effect; subacid in flavor. The fruit thus far produced in this region has been rather inferior in appearance and quality. Its season in New Jersey and Delaware begins the last of July to the first of August.

Bonum. Synonym: *Magnum Bonum.*

The Bonum apple is supposed to have originated in Davidson County, N. C., and has been in cultivation many years. It is quite widely distributed throughout the South. In this region it is growing in many places in North Carolina, largely in the older orchards, and to some extent in Virginia. It is rarely found at more northern points.

The tree is fairly vigorous and generally healthy, with dark heavy foliage. In the sections above mentioned, it is a regular bearer. The fruit is small to medium in size, occasionally large; its under color is yellow, overlaid with dark crimson; mild subacid flavor and of excellent dessert quality. In the sections referred to, its season begins early in September and continues through the greater part of October. It is even said by some growers that it can be kept all winter without special care.

For home use, a personal market, or even for general commercial purposes this variety appears to be worthy of more extensive planting in these sections. Indications point also to a range of adaptability extending as far north as central Delaware. The high dessert quality and fine appearance of the fruit make it particularly attractive. It is admirably suited for hotel or other trade where a highly colored apple of fine quality and not over large size is desired.

Bough. Synonym: *Sweet Bough, Large Yellow Bough.*

The first mentioned synonym is the name under which this variety is generally known, but it is reduced to Bough under the rules of nomenclature of the American Pomological Society. This is also the name under which it was described in 1817 by Coxe, this being the earliest published description. Its origin is obscure, except the mere fact that it is a native variety.

The Bough apple is widely distributed in many sections of the country, and in this region it is in many orchards throughout the Maryland, Delaware, and New Jersey sections, though not produced in large quantities.

The tree is only moderately vigorous under the conditions in these sections. Some complaint of its being short lived is made. A few instances of rather serious twig blight have been observed, but this does not appear to be common. Shy bearing is reported by some, but, as a rule, fairly regular and abundant crops are produced. The fruit is medium to large, greenish yellow, tender, crisp, and of a rich, sweet flavor. Its season usually lasts about two weeks in individual orchards, though occasionally the fruit is all harvested at a single picking. It may be had at some point in the sections mentioned during most of July, the exact date of maturity depending upon the location and local conditions.

Experiences differ as to the profitableness of this variety. Its principal use, on account of its flavor, is for eating out of hand or for baking. It is the one sweet early variety that is commonly grown, hence it may be of particular importance for this reason. It is probably better adapted to a special trade or a personal market than it is for general commercial purposes. It is said to sell well at some of the seashore resorts along the New Jersey and Delaware coast.

Buckingham. Synonyms: *Fall Queen, Equinetely, Byers' Red.* Nearly thirty other synonyms have been applied less generally than the ones here mentioned.

The history of this variety traces back with fairly definite records to 1777 to the garden of Col. John Byers, of revolutionary fame, who lived in Louisa County, Va. The Buckingham is quite widely distributed in many sections of the South, but is not grown in large quantities. It is in a few orchards in the Virginia and North Carolina sections of this region, but is relatively unimportant.

The tree in a large proportion of the orchards in these sections where it is found is a weak grower and more or less subject to certain diseases. The fruit, when well grown, is large; under color yellow, heavily washed over most of the surface with crimson and rather indistinctly striped; subacid, very pleasant; good to very good. In these sections its season begins early in September, but continues for several weeks so that it may be considered an early fall rather than a summer variety.

It is of doubtful value in the Virginia and North Carolina sections of this region. Even in the orchards where the trees are in good condition the fruit does not mature well and is apt to rot, indicating a lack of adaptability to these conditions. As the variety is well adapted to the conditions existing in the Piedmont and Blue Ridge regions of Virginia and North Carolina where the altitude is higher than in the Coastal Plain, it is possible that it would do relatively better in the northern portion of this region than it does in the southern.

Celestia.

This variety originated in Miami County, Ohio. The original tree is said to have been a seedling of Stillwater. It has been in cultivation for forty years or more though it has never come into general cultivation. It has been found in only two or three orchards in this region and in the adjacent areas. These are in Delaware and Virginia.

The tree is a fine, thrifty, upright grower and a prolific, nearly annual, bearer. Fruit large; roundish conical; pale yellow, moderately sprinkled with gray or brown dots; flavor rich, mild, subacid, very pleasant; quality very good. It reaches edible maturity in the Virginia location about the first of September and is slightly later farther north in the Chesapeake peninsula.

Though the trial of this variety in this region has not been sufficient to warrant definite conclusions, it is promising for its season and highly prized by the few growers who have had experience with it.

Champlain. Synonyms: *Nyack, Nyack Pippin.*

In this region this variety is known as Nyack or Nyack Pippin. It is supposed to have originated in Vermont or New York, but historical data are lacking. It is grown to a limited extent in some sections of the North, but is not generally known to fruit growers. It is in quite a large number of orchards in New Jersey and Delaware, but as in the North very many of the growers are unacquainted with it.

The tree is a fairly vigorous, somewhat upright grower, apparently long lived. It is generally productive, bearing nearly annual crops in some orchards. The fruit is medium to large; greenish yellow, sometimes with blush on exposed side when fully ripe; pleasant subacid flavor. It is usually shipped from these sections during the last week or ten days of July and early August. The fruit holds to the tree fairly well, so that it may be handled during a rather long period of time.

While of minor importance, relatively, in the sections of this region where it is grown, it is usually considered a desirable commercial variety, though perhaps less profitable than some other sorts.

Chenango. Synonyms: *Chenango Strawberry, Strawberry, Sherwood's Favorite.*

This variety probably originated in New York, though some accounts suggest Connecticut. It is grown sparingly in many sections of the North; in this region it is not being grown commercially and is to be found in but very few orchards.

The tree is fairly satisfactory in its habit of growth. Fruit is oblong, conic, above medium size; whitish yellow, striped and splashed with crimson; pleasant subacid; very good. In the New Jersey section the season begins about the first of August.

The locations where the variety has been reported are on light, sandy soil. It does not appear to be well adapted to this region. At one place in central New Jersey, under rather indifferent cultural conditions, the fruit is said to decay usually before it ripens,

and it seldom, if ever, colors well. Besides this it does not develop properly. This has been the continuous record of trees which are from 35 to 40 years old. Younger trees in southern Delaware have perhaps been slightly more satisfactory, but it is apparently of little, if any, value here.

Colton. Synonym: *Early Colton.*

This variety is said to have originated in Franklin County, Mass., on the farm of a Mr. Colton. It has been propagated more or less for nearly seventy years usually under the synonym mentioned. It has some prominence in the Delaware and Maryland sections of this region, where it is grown more or less on the light sandy soils characteristic of these sections.

The tree is moderately vigorous, healthy, and fairly prolific, but in many instances, even under good care, the fruit fails to develop satisfactorily and many culls result. It bears with a good degree of regularity, producing some fruit nearly every year. The apple is of medium size, greenish yellow, sometimes blushed on exposed side, and of subacid flavor. The normal season of ripening in these sections is about the middle of July. The fruit is sometimes handled in a rather immature condition as early as the first week in July. It matures quite evenly, so that frequently the most of the crop can be gathered at a single picking.

In the experience of some growers, this variety is not as good for shipping as some other sorts, especially when marketed in a fully ripe condition. It is inclined to turn dark under the skin if bruised, rendering it unattractive in appearance. At present it is not of great value in this region and as there are one or two other more desirable varieties, especially Early Ripe, of nearly the same season, it is doubtful if it will become of any special importance here, though possessing some merit

Cornell. Synonyms: *Cornell's Fancy, Cornell's Favorite.*

The original tree of this variety is said to have stood on a farm owned by Mr. Gilman Cornell and situated in Southampton township, Bucks County, Pa. It is not much grown in this region, being confined mostly to a few orchards in the New Jersey section. Light sandy soils characterize the locations where it has been observed. Some complaint is made that the trees lack vigor and are short lived.

The fruit is medium size or above, much resembling Chenango, with which it is doubtless sometimes confused. It is of better dessert quality than that variety. It appears to be better adapted to the section above mentioned where it is being grown than Chenango, since it develops to a good degree of perfection without manifesting the defects referred to under that variety. It begins to ripen about the middle of August in central New Jersey.

Cross.

The Cross apple originated near Fair Play, Washington County, Md., but has not become widely known. So far as observed in this region, it is growing in only one orchard, which is located in Caroline County, Md.

The tree is a strong, vigorous grower and an abundant bearer. The fruit is large; roundish oblate; greenish yellow, striped and splashed with light red; slightly subacid; good to very good in dessert quality; also recommended for culinary purposes. In the section above mentioned it ripens from the middle to the last of August. It has not been sufficiently tested in this region to demonstrate its value, but is considered very promising for its season by the one grower interviewed who has it under observation.

There is a Russian variety grown under this name which is a late-keeping sort.

Dawes. Synonym: *Dawes Porter.*

Origin, Massachusetts. This variety is known only to one or two growers in this region, hence it has not been tested sufficiently to determine its value. It is a large apple; light yellow, shading to a darker color with a suggestion of red; mild subacid,

rich; very good. It ripens during August in the central part of the Chesapeake peninsula.

Early Edward. Synonym: *Edward Early.*

Aside from the fact that this variety is of American origin, its history is obscure. It was mentioned by James Mease in the first American edition of "The Domestic Encyclopedia," which was published in Philadelphia in 1804. It is grown to a very limited extent, and in this region it is to be found in only a small number of the older orchards.

The tree is fairly vigorous and productive. Where the San Jose scale is a serious pest it appears to be peculiarly resistant to this insect. It has been observed that when certain other varieties are even destroyed by it, this one remains nearly free from attack. The fruit is of medium size or above; yellow, washed and striped with red and crimson; subacid, pleasant; very good in dessert quality. In the central and northern sections of this region, ripening occurs the last of July and the first of August. When fully ripe, rotting at the core is frequently serious. For this reason its value for market purposes is doubtful, but it may have a place for home use on account of its high dessert quality.

Early Harvest. Synonym: *Prince's Harvest.*

This apple was first mentioned in American pomological writings in 1806. It is therefore a very old variety and supposed to be of American origin. Few varieties have become so widely disseminated over a large portion of the country as this one. Throughout this region it is probably the most widely grown of any sort. However, it is to be found more generally in the older orchards, having been planted but little in recent years.

Generally the tree is fairly vigorous and healthy, though in some sections of this region, especially in the North Carolina portion, it is often badly affected with stem or trunk tumors or knots [a] and certain other fungous diseases. The fruit is, typically, medium to large in size; pale-yellow color; pleasant subacid flavor; dessert quality, very good. Ripening begins at southern points in this region by the middle of June; in the northern portion it is about three weeks later.

As ordinarily grown, the fruit is very irregular in size and grade, many poor, knotty specimens being produced. It is much subject to injury from the plum curculio. Hence a considerable proportion of the crop is usually of low grade, which renders it less profitable commercially than some other varieties of the same season. As a market sort, therefore, it is not popular. Its high dessert quality, however, gives it a place in the home orchard. It is probable that it is better adapted to the climatic conditions in the northern or New Jersey portion of this region than at southern points. Here the tree is generally less subject to disease and as a rule the fruit develops to a higher degree of perfection.

Early Joe.

This variety originated many years ago at East Bloomfield, Ontario County, N. Y., in the same orchard with Northern Spy and Melon. It is said to have received its name from the fact that a man by the name of Joe was for a time accustomed to steal the fruit early in the morning before he was in danger of being observed. It is not much cultivated in any section. In this region, it exists in only an occasional orchard. The trees which have been observed here are making a rather poor, unsatisfactory growth. The fruit is small to medium; oblate, conic; dull greenish-white undercolor, with dull red washing and striping; tender, juicy, mild subacid, and of high dessert quality. Its season in the central portion of this region is the last of July and early August. Its high quality commends it for home use, but it

[a] See Circular 3, Bureau of Plant Industry, U. S. Dept. of Agriculture.

is too small for market purposes. On account of the weakness of the tree, however, it is of doubtful value in this region for any purpose.

Early Ripe.

This variety is supposed to have come originally from Adams County, Pa., but the point is open to question. It is evidently not generally known over a wide range of country, but in this region it is one of the most important of the early commercial sorts of the white or yellow skinned varieties. It is grown extensively, however, only in the Chesapeake peninsula sections. There appears to be no well-defined reason why it has not become known and generally planted in New Jersey, but it

FIG. 2.—An Early Ripe apple tree in Delaware, about 15 years old.

is practically unknown in that section; the same is true in the Virginia section. In North Carolina it is to be found in a small number of orchards.

The tree is rather upright in habit of growth, with strong tough limbs not easily broken. (Fig. 2.) It bears early and in most cases abundantly, with nearly annual crops. The fruit is medium or above in size, yellow, subacid, of firm texture, good quality, and less subject to insect injury, especially the plum curculio, than many other varieties.

In season it is one of the earliest. In some places it is the first variety to be shipped from the section where it is extensively grown. It cooks well before it is fully ripe,

and this fact is often taken advantage of by the growers, who market it earlier, by a few days, than could otherwise be the case. The first pickings are often made in central Delaware during the last days of June; it is usually all marketed by the middle of July. In the North Carolina section it is about two weeks earlier. The fruit holds to the trees well, however, so that its market period, including the period of full maturity, is longer than that of most early sorts, extending over nearly a month, if desirable to hold the fruit that length of time. On the other hand, the fruit matures quite uniformly and it may generally all be gathered in two pickings if desired. Its texture remains firm when fully ripe; hence, it is possible to handle the fruit largely in accord-

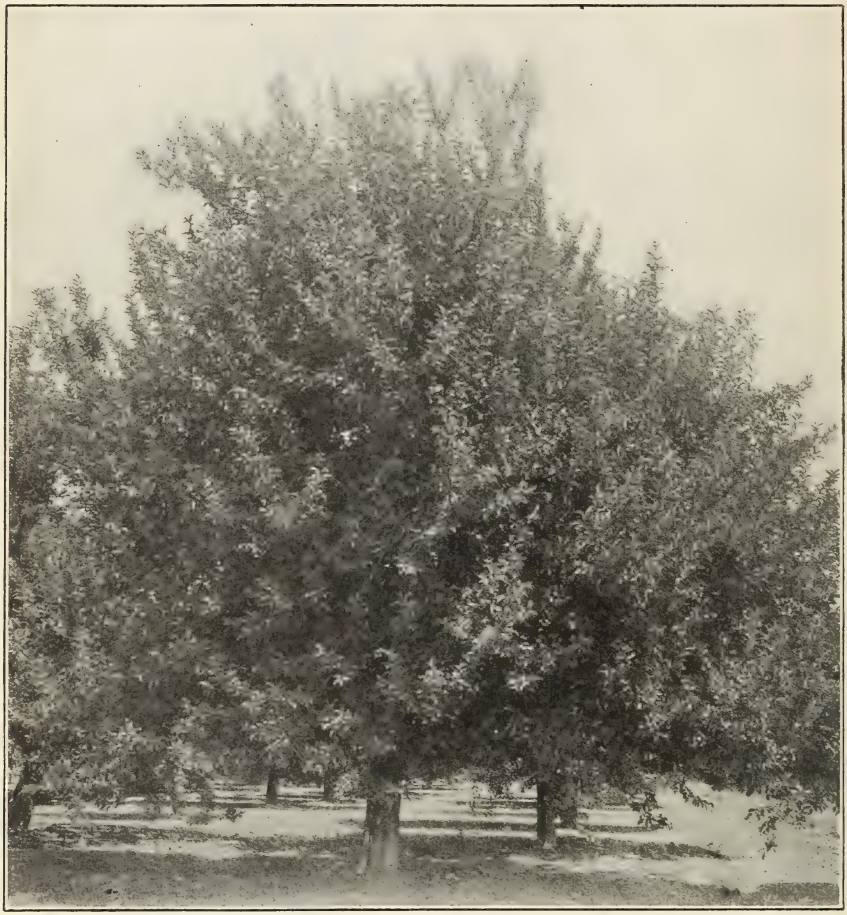

FIG. 3.—An Early Strawberry apple tree in Delaware, about 50 years old.

ance with market conditions. It appears probable that it would be a satisfactory variety for its season throughout the region. It has been planted extensively in recent years in the Chesapeake peninsula section instead of Early Harvest. In one or two instances, this variety has not given its accustomed satisfaction, being late in coming into bearing and otherwise faulty. Such experiences, however, are exceptional.

Early Strawberry.

This variety is supposed to have originated in New York. It was referred to in pomological literature prior to 1840, and is widely disseminated though not exten-

sively grown. It is quite widely distributed in the New Jersey and Chesapeake peninsula sections, but is seldom seen in other portions of this region.

The tree is a strong upright grower and apparently long lived. (See fig. 3.) It is slow in coming into bearing. As a rule, only very light crops are borne before the trees are 10 or 12 years old, or even considerably older in some cases. The fruit is small to medium; roundish conic; yellowish undercolor, frequently almost entirely overspread with red, sometimes striped with darker red; texture rather firm; very good to best in dessert quality. The season of ripening begins about the middle of July in central Delaware and lasts for two or three weeks, the fruit ripening very gradually. Several pickings are therefore necessary.

Opinions differ widely in regard to the value of this sort. It is considered one of the most profitable by some; others regard it as practically worthless commercially. The late-bearing habits of the tree have already been mentioned. This is a serious objection to many growers. Unless thoroughly sprayed, the fruit usually scabs very badly. It is too small for ordinary commercial purposes, but on account of its attractive appearance and high dessert quality it is well suited to a personal market or some special trade. It is said to bring fancy prices at some of the summer resorts along the coast of New Jersey and Delaware. It is thus evident that satisfactory results can be realized only when the fruit is grown under high culture and is skillfully marketed.

English Codlin.

As the name suggests, this variety is of English origin. It is cultivated very little in this country. In this region it is confined almost exclusively to the New Jersey section.

The tree is a good grower. Fruit roundish oblate; large; yellowish green, with bronzing on exposed side; subacid; quality good, especially desirable for cooking.

The place which this sort fills in the early-apple growing industry of the New Jersey section is rather distinct from that held by most other early varieties. As indicated elsewhere most of the early apples are marketed in baskets or other small packages, but this variety is generally shipped in barrels. It meets with special favor in the Boston markets, where very satisfactory prices are usually realized. It does not reach maturity in this section until the last of August or first of September, but it develops to a good size for culinary purposes, for which it is especially valued a month previous to this time, and as soon as it is large enough to cook harvesting and shipping are generally begun. While in some sections it may be held until fully matured, the above method is said to be one of the most satisfactory ways of handling it in New Jersey.

The variety is particularly well adapted to the heavier soils in this section, and when the trees are well cared for, nearly annual crops are produced. A single grower in the Virginia section of this region has reported this variety. In this case it is highly prized.

Fanny.

The Fanny apple originated in Lancaster County, Pa. It is referred to in the revision of Downing's "Fruits and Fruit Trees of America" for 1869 as "a new apple of great promise as a market sort." It is not, however, very much grown in any section. It is in a few orchards in the New Jersey and Chesapeake peninsula sections, but is relatively unimportant at present.

The tree is a fine grower in the nursery, of upright habit, and good vigor. In the orchard it is only moderately productive. In fact, some growers offer this as one objection to it. The fruit is medium or above in size; clear yellow undercolor, overspread with bright red, showing some stripes of a darker shade; pleasant subacid flavor; good to very good.

Its season in central Delaware is the last of July and early August, though it frequently extends over a considerable period. As a commercial variety for this region it is of doubtful value. In at least one orchard which is in a good state of cultivation, the fruit nearly all drops soon after it sets. Some growers speak of it as quite irregular

in the degree of perfection which it attains from year to year. On the other hand, other growers state that it gives satisfactory results under their conditions, though in some of these instances it is not considered of much value commercially. It is evidently more easily influenced by conditions than many varieties.

Garrettson. Synonyms: *Garrettson's Early, Somerset Harvest.*

This variety originated at Somerset, N. J. It has never been much disseminated and hence is but little known in any section.

The tree is a spreading grower, and is reported to be prolific. Fruit medium to large; bright greenish yellow; mild subacid; not of high dessert quality, but good for cooking. It ripens during the last of July and early August in the central part of the Chesapeake peninsula. The variety has not been sufficiently tested to determine its value in this region. It is doubtful if it is in any way superior to other better known sorts of the same season.

Glowing Coal.

This variety was disseminated some years ago by a New Jersey nursery, but it has not become generally known in this region. By some it is considered identical with Ohio Nonpareil, but available evidence does not support this opinion. It has been observed in but a single orchard, which is located in west-central New Jersey. The trees in this case are but 10 or 12 years old, hence it is not possible at the present time to draw any very definite conclusions about the merits of the variety. They have made a strong healthy growth. Light crops have been produced thus far, though the trees have blossomed full several times.

The fruit is large; roundish; greenish yellow, washed and splashed with crimson and with a slight overspread of gray; pleasant subacid; good to very good. Its season in west-central New Jersey is the last of August to the first of September. The tree characteristics and the quality of the fruit would make this variety a desirable one for its season, but it can not be generally recommended on account of its fruit-bearing proclivities.

Golden Sweet.

This variety is of Connecticut origin. It is not much grown in any section, but widely disseminated. In this region it is in a few orchards at widely separated points.

The tree is a strong grower and a good bearer. The fruit is large; roundish; yellow; rich, sweet; good to very good. It is considered by those who have it in this region a desirable variety for a sweet summer apple. As there is but small demand for sweet apples, however, it is doubtful if this would be a profitable market sort here. Its season is the last of July to the first of August in the middle sections of this region.

Grand Sultan.

This variety is of Russian origin; it is but little grown in this country. In this region it is in but a very few orchards. The one in which it has been under close observation for several years is located in the central part of the Chesapeake peninsula. The chief point of interest concerning it is its similarity both in tree and fruit to the Yellow Transparent apple. Its resemblance to Thaler is also close enough to be a source of considerable confusion. The best distinguishing difference between the Grand Sultan and these other two varieties, as grown in the section mentioned, is its relatively short, thick stem, which is a fairly constant characteristic.

There are perhaps more marked differences between this variety and the Yellow Transparent in some other regions. It is claimed in one section, at least, that the Grand Sultan tree is more vigorous and more upright in habit of growth than the Yellow Transparent and that it is more subject to twig-blight and less productive. These differences, however, as already noted, do not appear under the conditions existing where these varieties have been critically observed for a number of years. The Grand Sultan apple bears early and abundantly. Its season is the same as that of the Yellow Transparent.

Gravenstein.

This is a German introduction, but when it was first brought to this country is a matter of doubt. It appears quite certain that two trees were imported and planted in a garden in Boston in the spring of 1826. There is some evidence that scions were imported at another time; this may or may not have been at an earlier date. The variety is widely distributed throughout the country. In this region it is one of the most common and important varieties of its season, except in the North Carolina section, where it is rarely found.

The tree is a strong, vigorous, spreading grower, producing a large bearing surface. It comes into bearing fairly young, but not so early as some others. Under high culture it produces nearly annual crops, but as ordinarily grown the "off-year" crop is usually small. It is, however, a heavy bearer in full crop years. The fruit is medium to large; roundish oblate, angular; yellow, striped and splashed with bright red; subacid, aromatic; very good.

It is primarily an August apple in New Jersey and the Chesapeake peninsula, though the "drops" are frequently shipped the last of July. Most of the fruit is usually shipped from points as far south as central Delaware by the middle or 20th of August, while it is frequently held in some of the New Jersey orchards until some days into September.

The characteristics of the fruit make it an excellent general-purpose variety. It is excellent for cooking, for dessert, and likewise a good shipping variety. Its long season of ripening commends it for the home orchard where only a few trees can be grown. It is said to be a satisfactory variety to put in cold storage. While there has been very limited experience in handling it in this way, as is true of all early varieties, the possibility of holding it when desirable to do so may be worthy of consideration by growers in this region.

Hawthornden.

This is a Scotch variety which was brought to this country many years ago and which has been disseminated to a slight extent in some sections. So far as observed it is confined in this region to a very small number of orchards in the New Jersey and Chesapeake peninsula sections. It is unknown to most growers.

The tree is said to be a slow grower in these sections and is improved by top-working on some other vigorous sort. It bears annually and abundantly. The fruit resembles that of Maiden Blush somewhat; there appears to have been some confusion between these two varieties. Fruit medium to large; roundish oblate; pale yellow, with blush on exposed side. It ripens early in August, the same season as Maiden Blush, and is considered superior to that variety by the small number of growers who have expressed an estimate of its value. The general reputation of the variety, however, places it as inferior to Maiden Blush in flavor.

Horse.

Much confusion exists in regard to the application of the name Horse, as several sorts of doubtful identity are known more or less locally by it. In some sections the name has nearly the significance of a type name, any large, yellow apple ripening early in the season being called a Horse apple. The variety to which the name is properly applied has been in cultivation many years. Its place of origin is obscure, but it is commonly credited to North Carolina. It is found in many of the older orchards throughout the South. At one time it was considerably planted in Indiana, but it is rarely found in the North. In this region it is common in the North Carolina section, occasionally in Virginia, but rarely elsewhere.

As observed in the North Carolina section, the tree is considerably subject to twig-blight; trunk or stem tumors are also common. However, the trees are given very little attention here, so that in comparison with the standard varieties in other sections of this region this fact should be considered.

For the purpose of aiding to establish the correct identity of this variety a detailed description of it follows: Form roundish; size large; cavity regular, medium size, deep, abrupt with some russet markings extending over base; stem short, medium stout; basin regular, medium size, slope gradual, furrowed and russeted; eye very large, open; surface moderately smooth except ribbing; color yellow, with delicate blush on some specimens, sometimes small patches of russet; dots variable, mostly small; flesh yellow, medium-fine texture, juicy; core round, conic, clasping, medium size, partially open; flavor subacid, rather rich; quality good to very good. Its ripening season extends over a considerable period, beginning in the North Carolina section by the middle of July and continuing through August.

Under good conditions this would doubtless be a satisfactory sort for southern latitudes of low elevation, both for home use and local markets.

Jefferis.

This is a native variety of Pennsylvania, having originated with Mr. Isaac Jefferis, Newlin Township, Chester County. It was awarded a premium offered by the Pennsylvania Horticultural Society for the best seedling exhibited in 1848. It is quite widely distributed through the North, but is to be found mostly in the older orchards. It is almost unknown in this region, having been observed in only two or three orchards which are widely separated from one another.

The fruit is medium in size, oblate; greenish yellow with broken stripes of crimson; sprightly subacid; quality, very good. It has a comparatively long season, which in the Virginia section of this region begins about July 20. Its high dessert quality commends it for home use and a fancy retail trade, but it is too small for general commercial purposes. It would apparently do well in the central and northern sections of this region under good cultural conditions.

Jersey Sweet.

The origin of this variety is doubtful, but New Jersey is commonly supposed to be the section whence it came. It is quite widely distributed in the North, though it is not extensively grown. It exists in a few orchards in the central sections of this region, but is unknown to most of the growers.

The fruit is medium to large, roundish; yellow undercolor washed with mixed light red, splashed and striped with bright crimson; sweet, rich; of very good dessert quality. In the Virginia section it usually begins to ripen from the 10th to the middle of August. It may be worthy of consideration as a sweet variety for this region and is referred to here primarily to call attention to its possible value.

July. Synonym: *Fourth of July.*

This variety, which is of the Tetofski type, is said to have reached this country from Cassel, Germany, and to have been introduced by Mr. C. F. Jaeger, Columbus, Ohio. On the other hand, another account states that it was introduced into England from Russia during the lifetime of Mr. Thomas Andrew Knight, and thence found its way into Virginia. From this section it was disseminated northward and westward under the name Fourth of July, its original name having been lost. Though apparently more or less distributed in various sections of the country, it remains unknown to most fruit growers. In this region it is confined primarily to the Chesapeake peninsula section.

The tree makes a vigorous upright growth, with large, glossy, rather coarse foliage. (See fig. 4.) It begins to bear young, trees 3 and 4 years old frequently producing some fruit, but it does not reach full bearing as young as some varieties do, neither has it proved as uniformly productive. Some orchards which have been planted 10 to 12 years have not yet borne much fruit, though light crops have been produced for several years. The general conditions, however, in the particular orchards in question are not materially different, so far as can be determined, from those of other orchards in which more satisfactory results have been obtained. The fruit is above

medium in size; conic; dull yellowish, lightly washed and striped with red; subacid; good.

In the commercial orchards of the Chesapeake peninsula this variety ranks as one of the important market sorts, yet it is not held in universal favor, even in different orchards which are under practically uniform conditions. Perhaps its strongest claim to an important place is its early season of ripening. In many orchards in this section it is often nearly all marketed by July 10, though in such cases it is usually

FIG. 4.—A July apple tree in Delaware, 12 years old.

picked in a rather immature condition. From the middle to the 25th of July, as a rule, may be considered its normal season. It appears to be rather more susceptible to the influence of relatively slight cultural differences than many varieties are.

If the fruit is bruised it quickly turns dark; it also discolors badly if slightly overripe, and sometimes cracks. While fairly heavy crops are frequently produced, there is usually a larger percentage of culls than in many varieties. The fruit is borne largely in clusters, especially if the trees are heavily loaded. It will thus be seen that this variety possesses rather serious faults, yet it is considered a fairly profitable variety by many on account of its sequence in ripening and the time at which it can be marketed.

Kane. Synonyms: *Cain, Cane, Red Cain.*

This variety originated in Kent County, Del. It has been disseminated but very little; even in the section where it originated very few growers have any knowledge of it.

The tree makes a good growth and apparently bears fairly well. The fruit is medium to above in size; oblate conical, regular; whitish yellow with waxy appearance, heavily shaded with crimson; crisp, juicy; good. In the Chesapeake peninsula section its season is about the middle of September or before, but the fruit will keep several weeks. While not strictly a summer sort, it apparently has some merit for its season, though not sufficiently tested to determine its full value.

Keswick. Synonyms: *Codlin, Keswick Codlin.*

This is an English variety which has been grown more or less in this country for many years, but not extensively in any section. It is in a few orchards in the New Jersey section of this region.

The tree is moderately vigorous. The fruit is medium to large; roundish oblong, conic; greenish yellow; acid; good. Its season of ripening is about the same as that of the English Codlin, but as in case of that variety it is frequently shipped before it is fully mature. On some of the heavier soils of this region, which are to be found in the section from which this report comes, the fruit is said to have a soft texture, does not mature well, and is of little commercial value. It is reported to have been substituted frequently by nurserymen in filling orders for the English Codlin, to which it is claimed to be very much inferior in the section above named.

Kirkbridge. Synonym: *Kirkbridge White.*

The place of origin of this variety is unknown. Many years ago it was planted considerably in the Middle West, especially in Indiana, being brought there from New Jersey by Quakers when going to that State for their yearly meeting. At the present time it is almost unknown in this region, being reported from only one or two points.

The tree is a slow upright grower and an early abundant bearer. The fruit is roundish; medium size; color, greenish white, sometimes with slight bronzing on exposed side; tender, juicy, subacid; good. In Delaware it ripens about the middle of July.

Lowell. Synonyms: *Greasy Pippin, Tallow Apple.*

This variety is of unknown origin, aside from the fact that it is a native sort. It is quite widely distributed in numerous sections of the country, especially in the older orchards. It is rarely found in this region, but occurs occasionally in orchards in the northern sections.

The tree is a vigorous, spreading grower, and produces nearly annual crops. The fruit is above medium size, yellow, brisk acid flavor, and good to very good in quality. In the New Jersey section it begins to ripen about August 1. It is rather perishable, decaying soon after mature, or in some cases even before; its period of ripening extends over a space of 2 or 3 weeks. The premature decay of the fruit renders it less desirable than some other sorts of the same season.

Maiden Blush.

The Maiden Blush apple originated in New Jersey many years ago. It was first described in 1817 by Coxe, who then stated that it was esteemed in the Philadelphia markets. It is grown and still being planted over a wide range of territory and is remarkable in the fact that it is successful in so large a number of the apple-growing districts of the country. In this region it has been widely planted, though relatively of much greater commercial importance in the New Jersey section than elsewhere. It is, however, a standard sort for its season in the Chesapeake peninsula section. At southern points in the region it is found much less frequently, but is a variety known to many who have orchards.

The tree is a strong grower, as a rule, seldom showing defects of any kind. (Pl. IV, fig. 1.) With good culture, nearly annual crops are produced. The fruit is above medium size; pale yellow with blush, sometimes becoming a brilliant red on exposed side.

In some locations in Delaware shipments usually begin the last of July, but in New Jersey, where it has become of most importance, its shipping period is usually from the middle to the last of August. It is a valuable market sort, though it does not ripen at the season of highest prices. It is considered one of the standard sorts for the sections in this region where it is most grown.

A few growers who have this variety report adversely concerning it, but such experiences are rare. No explanation for such results is apparent. It may require higher cultural conditions than some varieties.

A few growers have put the fruit in cold storage for a period of two to four weeks with gratifying results. It is said to hold well in storage for the time named, and this permits placing it on the market in some seasons, at least, when prices are better than they frequently are during August.

Metz.

This variety is said to have originated in Jones County, N. C. It has apparently been distributed to a small extent locally, but is not widely known, even to those who have orchards in the tide-water section of this State.

The tree makes a fine, healthy growth, noticeably free from fungous diseases. The fruit is good size, oblate, smooth, more or less striped with red. It ripens in North Carolina the last of July and early in August. It is said to be excellent for cooking, and especially good for cider, producing a much larger quantity of juice than most varieties. It is recommended by some for growing near the coast.

No mature specimens of this variety have been seen by the writer. Its merits, aside from the tree characteristics noted above, are given here as reported by parties who are growing it.

Muster.

Aside from the fact that this variety was introduced many years ago, having been described by Warder in "American Pomology," published in 1867, nothing appears to be known relative to the history of this sort. It is likewise almost unknown to fruit growers. As far as observed, it is confined to a single orchard in this region, which is located in Caroline County, Md.

The tree makes a good growth with noticeably healthy foliage. The fruit is medium or above in size; oblate; yellow, covered with mixed red and crimson; fine grained, juicy; subacid, aromatic, rich; best quality. Its season is from the middle to the last of August in the section above mentioned. It is considered a valuable variety by the one grower who is acquainted with its merits, with whom it is proving nearly an annual bearer. Its high dessert quality commends it for home use, though for commercial purposes its season of ripening may be such that it would not be regularly profitable.

Oldenburg. Synonyms: *Duchess of Oldenburg, Dutchess, Borovitsky.*

This variety is of Russian origin. It is commonly supposed to have been first introduced into this country in 1834 by the Massachusetts Horticultural Society[a] at the same time that Alexander, Red Astrachan, and Tetofski were imported from the Royal Horticultural Society, London, England. However, unless the synonym Borovitsky was applied at a very early date to some other variety, it was introduced prior to 1833.[b]

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[a] See the quotation under Alexander for further historical information.

[b] Genesee Farmer, vol. 3, no. 24, 1833, p. 188.

The Oldenburg apple has become widely disseminated in many States, especially in the upper Mississippi Valley, where it is of value on account of the hardiness of the tree. It is not extensively grown in the Middle Atlantic States, though it is well represented in the sections where commercial orcharding has been developed. Occasional trees of it are also found in the more southern sections of this region.

The tree is a good grower, fairly vigorous, with dark, healthy foliage, though evidently not making a large tree. Some twig-blight has been observed, but it is not common. The tree forms a roundish, though spreading head. It bears nearly annually, usually producing abundant crops. The fruit is medium in size or above; yellow undercolor, well streaked with red when ripe; subacid; good. Its market period varies somewhat from year to year and with different growers. About the middle to the last of July, however, appears to be an average date for marketing in the New Jersey and Chesapeake peninsula section, but the fruit can be cooked satisfactorily before it is mature. It ripens quite evenly; the entire crop can frequently be gathered in two pickings. It keeps well after it is picked, having a tendency to shrivel instead of decaying, especially if picked before fully ripe. Its use is for culinary purposes rather than for dessert.

This is proving one of the most satisfactory varieties among the earlier sorts for growing near the coast at southern points. It would apparently be a profitable sort to grow more extensively in this region than is being done at present.

In this connection attention should be directed to the fact that there are several Russian varieties of the Oldenburg type which are very similar to that variety both in appearance and in season of ripening. Due care should be taken not to confuse any of these sorts with Oldenburg.

Orange Pippin (New Jersey).

This is a very old variety of unknown origin. The earliest records trace it to Genesee, N. Y., though it is not assumed that this was the place where it originated. It is commonly supposed to have come in the first place from New Jersey, where it is now cultivated to a limited extent in some of the older orchards. It evidently is rarely found elsewhere in any of the other fruit-growing sections of the country.

The tree is thrifty and long lived. The fruit is medium to large; yellow; subacid; and good to very good. It reaches maturity from the first to the middle of August, though as with so many of the early sorts it is frequently shipped at an earlier period, before it is fully ripe. It is said to hold well in cold storage for a short period, but it has not often been handled in this way.

There is a French variety by this name, but it is a later apple.

Parry White. Synonym: *White Wax.*

The origin of this variety is uncertain, but it probably came either from Pennsylvania or New Jersey.

So far as observed, it is grown commercially only in the New Jersey section of this region, and even here it is not an important sort. While the trees tend to bear annual crops under the best care and very heavy crops on alternate years under ordinary culture, the fruit is too small to be profitable, especially as it possesses no characteristics which make it particularly desirable in any way. It is a small, rather sprightly subacid apple with a white skin, beginning to ripen the latter part of July in New Jersey, but extending over a relatively long season.

Porter.

Porter is a New England apple which originated on the grounds of Rev. Samuel Porter, Sherborn, Mass., about 1798. It is found in many sections of the North in the older orchards. In this region it is quite common in the New Jersey section, but practically unknown to growers in other sections. The tree is long lived and not possessed of any serious faults.

The fruit is medium to large; oblong conic; yellow, in some cases having considerable blush on the side exposed to the sun; very good to best quality. Its season is about August 1 to 15.

It bears fairly well in New Jersey, though not as regularly as many other sorts. The fruit does not "take" well on the market, even though of good size and attractive appearance. It is therefore not a profitable apple to grow. It is a variety primarily for home use, either for dessert or culinary purposes.

Primate.

Until quite recently the origin of this variety was obscure, but investigations made within the past few years have apparently been successful in tracing it to its original source. In this connection the following quotation is of interest:

"The first tablet in New York State in memory of any apple was erected in the town of Camillus, Onondaga County, on the original site of the Primate apple tree. John T. Roberts, Syracuse, N. Y., on the 11th of September, 1903, caused a bronze tablet to be erected there. On this tablet is the following inscription:

On this farm Calvin D. Bingham, about 1840, produced the marvelous
PRIMATE APPLE.
Named by Charles P. Cowles,
God's earth is full of love to man.

"The ceremony called together a goodly number of people. It was a beautiful thing thus to commemorate an apple that is famous throughout New York State."[a]

This variety is quite common through the North and East, though not grown extensively. So far as observed, it is confined to the New Jersey section of this region. It is, however, in only a small number of orchards. Here the tree is not a strong grower, being considered somewhat tender and rather short lived. It is only moderately productive.

The fruit is medium in size or above; greenish white with slight blush on exposed side; subacid; and good to very good in dessert quality. Its season is about the middle of July, but it frequently extends considerably later as the fruit does not mature uniformly. The fruit is tender fleshed, hence not considered a good sort for shipping to distant markets, though good prices are reported when it is well handled. Its high dessert quality recommends it, however, for home use.

Randolph. Synonym: *Unknown.*

Though the exact origin of this variety is not known, a single tree, or at most, two trees of it, standing on a farm in Newcastle County, Del., were the first to receive recognition. This occurred in 1869. What was the source of this tree or trees, if there were more than one, has never been determined.[b]

The variety has been distributed in a limited way in the middle latitudes in the East and Middle West, but is not grown extensively. In this region, so far as observed, it is confined to orchards in Kent County, Del. But here it is not considered an important variety at the present time.

The tree is a vigorous grower, but in most orchards where it has been observed it is inclined to be less prolific than is desirable, and the foliage is often injured by some of the leaf-blight fungi. The fruit is small to medium in size; white, washed with crimson and striped with darker crimson; firm texture; mild subacid flavor, but not of high quality. Its season begins about the middle of July, continuing for about two weeks.

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[a] Proceedings of the Fifty-third Annual Meeting of the Western New York Horticultural Society, 1908, p. 151.

[b] For further historical information and detailed description of this fruit, see Yearbook for 1902, U. S. Dept. of Agriculture, p. 472.

While the Randolph apple possesses some good qualities, particularly firmness of texture and attractiveness of appearance, and ripens at a fairly good time, yet, on account of its small size and light, irregular bearing proclivities, it is not considered of special value by most of the growers in this section. The fact that it ripens practically with Williams, which is a finer and larger apple, has also had an influence in the matter, the latter being considered superior in essential particulars. In certain sections of the country, where it is being grown in a limited way, greater value is attached to it than by the growers in Delaware.

Red Astrachan.

Though this variety is of Russian origin, doubtless from the province of Astrachan, it evidently first reached this country through England, being introduced by the Massachusetts Horticultural Society in 1834.[a] It was also introduced direct from Russia in the large collection of varieties imported in 1871 by this Department.

This variety is generally distributed throughout the North, and is also one of the most important early varieties in this region. It is grown more at southern points in the region than most other early varieties. It is reported as doing fairly well in close proximity to the salt water at points along the Virginia coast, as well as at other places farther south.

The fruit is medium to large; under color greenish yellow, almost entirely covered with deep crimson, in some cases showing more or less striping; flavor a sprightly acid, too sour to be pleasant for dessert purposes, but excellent for cooking. In season it is essentially a July apple in the central and northern sections of this region. The characteristics of the tree are shown in Plate IV, figure 2. It is a strong grower, with heavy dark foliage. It is late in coming into bearing, seldom producing much fruit before it is 8 to 10 years old. Heavy crops are generally borne every other year, with light ones on the "off" year.

In the New Jersey section but few are marketed before the 10th to the 15th of July. In the North Carolina section its season begins by the middle of June. As the fruit matures unevenly, the ripening period extends over a space of two or three weeks. It should be picked as soon as the fruit is fully ripe, or slightly before, else it soon becomes mealy and often cracks.

The fruit is borne largely in clusters, the individual specimens of which ripen irregularly, one at a time. It is difficult to gather the ripe apples without at the same time removing large quantities of fruit which have not reached a desirable stage of maturity. When the fruit is shipped as soon as it reaches a desirable size, as is frequently done, without special regard to color, the proportion of poorly colored specimens in a picking is of little or no consequence; but when highly colored fruit is desired, this characteristic is objectionable in the variety.

The fruit is somewhat inclined to decay in some orchards before it is ready for market, but this is not a general experience in this region under good cultural methods. There are apt to be a good many small and otherwise unmarketable apples, so that in close grading there is a heavy percentage of low-grade fruit and culls.

While this variety has some rather serious faults in this region, it also has many points of merit, and there appears to be no other red sort to substitute for it, especially in point of season.

Red June. Synonyms: *Carolina Red June, Carolina Red, North Carolina Red June.*

The place of origin of this variety is in doubt, but it is generally assumed to be North Carolina. It has long been in cultivation and has become very widely disseminated, especially in middle latitudes and the South. In this region it is quite common in the Chesapeake peninsula and Virginia sections, and in the North Carolina section it is perhaps grown in more orchards than any other early sort.

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[a] See the quotation under Alexander for further historical information.

The tree is of fairly vigorous, upright growth and generally productive. The fruit is small to medium in size; oval, somewhat irregular, inclined to be conic; when fully colored nearly the entire surface is deep red, with a light bloom; tender, juicy, with brisk subacid flavor; quality good to very good. Its season of maturity usually begins from June 10 to 15 in the North Carolina section; in Delaware it averages about three weeks later, continuing for about two weeks.

Under good cultural conditions it bears more or less annually, with a good proportion of fairly heavy crops. It probably does not withstand neglect as well as some varieties do, but it responds readily to good culture. The foliage is somewhat subject to some of the leaf-spot fungi. Apple scab is frequently serious on the fruit if not well sprayed, but with proper attention to these details excellent fruit of the variety is grown. There are some indications that rather finer fruit is produced on the heavier soil in this region than on the very light sandy types.

The small size of the fruit is the most serious defect as a commercial variety. Some seasons, however, it is profitable as a market sort and is always desirable as a dessert apple for home use.

In some sections of this region, especially in North Carolina where this sort has been widely grown for many years, there is a considerable number of varieties, mostly unnamed and of local distribution, that very closely resemble Red June in appearance and in other ways. They may be seedlings of this variety, though as a rule little or nothing is known of their origin. The most of them ripen about with Red June and are similar to it in size, color, and flavor. Others are larger in size, some are distinctly more acid, while still others are sweet in flavor.

Roadstown. Synonym: *Roadstown Pippin.*

This is a local variety which originated in southern New Jersey near a place by the name of Roadstown, and, so far as observed, its cultivation has not extended much beyond the region of its origin.

The tree is a strong upright grower. It produces very heavy crops and tends to bear annually. The fruit is large; greenish yellow, frequently bronzed on the exposed side; subacid; rather oblate in shape; good dessert quality, and especially fine for cooking. It does not reach full maturity until about September 1, but it is a large apple and develops to a good size for culinary purposes relatively early in the season, so that shipping begins by the latter part of July. In this respect it is similar to English Codlin, and like this variety it usually meets with a ready sale in the Boston markets at more satisfactory prices than most other varieties with which it comes into competition. In this section of New Jersey, where the soil is heavier than in most places in this region, the fruit apparently possesses much merit as a commercial sort. It is suggested for careful testing in other sections.

Sandbrook.

This variety originated near Sergeantsville, N. J. It was introduced about twenty years ago, but it has not been much disseminated. It is growing in a very small number of orchards in the Chesapeake peninsula and New Jersey sections of this region.

The tree is a strong grower in the nursery, but of moderate growth as it becomes older. It is prolific when full bearing age is reached. The fruit is small to medium; prettily washed with red and striped with bright crimson; subacid; good to very good. It ripens from the last of July to the middle of August in the central part of the Chesapeake peninsula. The small size of the fruit renders it undesirable for market, but it is considered valuable for home use by some growers.

Smokehouse. Synonyms: *Gibson's Vandevere, Mill Creek Vandevere, Red Vandevere.*

This is a very old variety which apparently originated during the latter part of the eighteenth century on the farm of Mr. William Gibson near Lampeter, Lancaster County, Pa. It was called Smokehouse because the tree stood near the building used for smoking meats. It is widely known in the middle latitudes south of and including

Pennsylvania and east of the Mississippi River, though not grown in large quantities. Occasionally it is grown farther west, but not commonly. In this region it is more of a fall apple than a summer variety, although at southern points it should be grouped with the early sorts. It is more often found in the New Jersey section than elsewhere, but it holds relatively an unimportant place.

The tree makes a large, spreading top; it probably does not come into bearing quite as early as many varieties do, though not considered particularly late in reaching bearing age. The fruit is medium to large; greenish yellow, washed and mottled with red or crimson, sometimes more or less overspread with gray; prominent russet dots; subacid; good to very good. In the New Jersey section, as above indicated, it is a fall apple, ripening about the middle of September, and it may be kept for several weeks or even months, but at southern points it reaches maturity the first of September.

For a large portion of this region this appears to be a good general-purpose variety for its season. The trees bear well; it is a good market variety of sufficiently high dessert quality to have a place in home orchards.

Sops-of-Wine.

This is an old European sort which has become more or less disseminated in this country, but it has never been extensively grown. It is seldom included in recently planted orchards. It is rarely grown commercially in this region, but an occasional tree of it is found in a few orchards in the central and northern sections.

The tree makes a good growth and bears at an early age. The fruit is roundish, medium size, yellow, shaded and splashed with deep red, frequently becoming so completely shaded that the striping is obscured. Flesh is rather dry, subacid, and possesses a peculiar characteristic flavor which is exceedingly pleasant to some, but less agreeable to others. The fruit ripens about the middle of July. It often decays rather badly about the calyx before it is ripe, and drops considerably. Under neglected conditions the fruit is very irregular in size; also scabs badly if not sprayed. So far as observed, and in the opinion of those who know the variety in this region, there is little to recommend it for planting here.

Starr.

The best available records indicate that this variety originated near Woodbury, Gloucester County, N. J., on the grounds of Judge John Moore White, which were later owned by a Mrs. Starr. A son of Mrs. Starr is said to have been in the legislature about 1865 with the late William Parry. He gave Mr. Parry some scions of this variety, who propagated it under this name. The Starr has remained comparatively unknown in most sections, and in this region it is confined almost entirely to the New Jersey section, where it is grown to a considerable extent.

The tree makes a strong upright growth; bears early and abundantly, giving nearly annual crops under good cultural conditions. (See fig. 5.) The apple is large; roundish oblate; greenish white; subacid; good. It matures somewhat irregularly, but it is essentially a July apple in season, usually beginning to ripen by the 10th to the 15th of the month though not fully ripe until about the first of August. A good size is reached comparatively early, and as it cooks well before it is ripe, it is generally marketed accordingly. In fact, it should not be allowed to become too ripe before picking as it soon becomes mealy. Picking may thus be governed in a measure by market conditions, and if desirable its season may be made to extend over a considerable period. It is essentially a cooking apple, for which it is much sought after by those who know its qualities for this purpose.

In a few instances the trees have twig-blighted badly, but this is not a usual experience. The fruit shows bruises rather badly, which necessitates careful handling.

This variety possesses qualities which would appear to recommend it for more general planting in a large portion of this region. It is growing in importance.

Summer Hagloe. Synonym: *Hagloe.*

This is a very old variety supposed to be of American origin, though at one time apparently confused with an English cider crab apple called "Hagloe" and attributed to an English or European origin. Details of its early history, however, are obscure. It is not known to fruit growers generally, but in this region it is of considerable importance in the New Jersey and Delaware sections, though rarely grown in any of the other sections. The tree is a slow grower; the terminals are rather thick and blunt, thus making a tree of quite distinctive appearance. (See fig. 6.) Under good conditions of culture, very heavy crops may be expected in these sections on alternate years, and usually considerable fruit in "off years." It usually bears at 5 or 6 years of age.

FIG. 5.—A Starr apple tree in New Jersey, 8 years old.

The fruit is medium to large; oblate; whitish yellow, lightly striped and splashed with red on the exposed side, rarely becoming more highly colored; flesh rather tender, juicy, subacid; quality good; valuable for cooking rather than for dessert purposes. In the sections above mentioned ripening begins from the 15th to the 25th of July and continues about two weeks. The fruit is not generally marketed until it is nearly mature.

In most of the commercial orchards in these sections where this variety is grown it is considered an important and a profitable sort to grow, selling well in the markets. An occasional exception to this experience occurs, however, even in orchards that have received unusual attention, the variety being unproductive and unsatisfactory in nearly every essential particular. No explanation of such failures is apparent.

The tree is noticeably susceptible to serious injury from the San Jose scale, even when most other varieties are damaged but slightly.

Summer King.

The place of origin of this variety is in doubt, but it is generally supposed to be North Carolina. It is not grown in any section extensively and is comparatively unknown. This applies also to this region, as it has been located in only two or three orchards.

The tree is upright in growth, vigorous, and fairly productive. The fruit is medium to large; yellowish green, striped with crimson and red; mild subacid; very good in dessert quality. The season of ripening is comparatively long, extending through August in the Chesapeake peninsula section or even longer in some cases. In the

FIG. 6.—A Summer Hagloe apple tree in New Jersey, 48 years old.

North Carolina section the fruit is ripe about the middle of July. It is highly recommended by some for this region, especially in the central and northern sections, for dessert and also for market. The fruit reaches a good size early, so that it could be shipped over a long season, as is Starr, Wealthy, and some others. It is not widely enough tested, however, to warrant making heavy plantings of it.

Summer Rose. Synonyms: *Lippincott, Woolman's Harvest.*

This variety originated in New Jersey. It is an old variety, being referred to in the earliest American literature (Domestic Encyclopedia, 1804) relating to pomology. Though quite widely grown in this region it is not produced in large quantities.

The tree is a good grower, somewhat spreading, productive, bearing nearly annual crops. The fruit is small; roundish oblate; whitish, striped and blotched with red;

tender, juicy, sprightly subacid; quality is excellent as a dessert fruit. Not only the flesh, but the skin also, is so tender that bruising results from any other than the most careful handling. The small size of the fruit also further renders it of little value for commercial purposes, but its high dessert quality recommends it for home use. It is in the height of its season about the middle of July or a little later at central points in this region.

Tetofski. Synonym: *Tetofsky.*

This is another one of the Russian introductions which was brought to this country through England. Further historical details appear in a quotation under Alexander. The dissemination of this variety has been quite extensive, though it is not grown in large quantities in any section. It is in a few quite widely separated orchards in the Chesapeake peninsula and New Jersey sections of this region but it is of quite secondary importance.

The tree is a very upright fairly strong grower and a prolific bearer. The fruit is medium in size; roundish, oblate conic; juicy, sprightly acid; of good quality. It is more desirable for market and for cooking than as a dessert apple. Its season in the central part of the Chesapeake peninsula begins usually from July 10 to 15, with a rather short period of duration.

Several growers variously located in the Chesapeake peninsula and New Jersey consider this a fairly good variety for its season, though perhaps not of sufficient value to take the place of other better-known varieties of the same season of ripening.

The tree is especially hardy and is probably rather better adapted to sections farther north than it is to this region.

Thaler. Synonym: *Charlottenthaler, Government List No. 342.*

This is one of a large number of varieties introduced from Russia in 1870 by the United States Department of Agriculture. It has never become widely known, at least not under its correct name or either of its synonyms. So far as observed it is confined in this region to a single orchard which is located in Caroline County, Md.

In the present connection the chief point of interest is the similarity of the fruit to Yellow Transparent, which is one of the most important commercial varieties grown in this region. It is also very similar to Grand Sultan, previously mentioned.

Comparing this variety with the Yellow Transparent, the fruit of the two sorts is practically identical so far as any constant distinguishable characters of individual specimens are concerned. Thaler is claimed by some to be a very few days later in ripening the bulk of its crop, though this is open to question. The owner of the one orchard in Caroline County, Md., in which these two varieties, also Grand Sultan, are growing, after a considerable number of years of close observation, is convinced that as they grow in his orchard, these two—Thaler and Yellow Transparent—are not distinguishable from each other in season, productiveness, or fruit characteristics, but that there is a marked difference between the trees, Thaler being a more vigorous grower, which is readily noticeable even in the nursery, and being much less subject to twig-blight than Yellow Transparent.

In some sections of the country the Thaler tree is reported to be less vigorous and productive than the Yellow Transparent. The limited range of observation in this region does not warrant definite conclusions regarding the relative merits of these two varieties for this region, but a thorough test of Thaler in the different sections appears desirable.

Townsend.

This is a very old variety, the origin of which traces to Bucks County, Pa., where it was discovered by Mr. Stephen Townsend nearly a century and a half ago in an old Indian clearing. While grown more or less in various sections in the older orchards, it is unknown to most fruit growers. It has been observed in but a single orchard in this region, located in west-central New Jersey.

The tree is a vigorous, spreading grower, fairly productive, but the crops are mostly alternate. The fruit is medium size or above; oblate conic; pale yellow, striped with red; subacid; good to very good in quality. The fruit usually is well colored by the last of July or the first of August in this section and drops as soon as colored. The ripening period lasts for a month or six weeks. By those who know the variety the fruit is esteemed for home use on account of its high dessert quality, but it ripens too irregularly to make it a desirable market sort.

Trenton Early.

The early history of this apple is obscure; it is known, however, to have been in cultivation for a long time. It was listed by Heikes & Wharton, a Pennsylvania nursery firm, in their catalogue for 1823. It is quite widely disseminated, but, as is the case with so many varieties, it is in comparatively few orchards. It would seem probable that it is in some of the older orchards in the New Jersey section of this region, though in the course of these investigations no trees of it have been found in this section. One or two orchards in the Chesapeake peninsula section contain it, but it is not common.

The fruit is large; conical; greenish yellow, sometimes with bronzed blush; pleasant subacid; good to very good. Its season in the sections named would probably begin the last of July or early in August.

Wealthy.

The exact date of origin of this variety is uncertain, but it was about the year 1861. The fruit was first described in 1869. The original tree is stated to have been grown from a collection of crab-apple seed which Mr. Peter M. Gideon, of Excelsior, Minn., obtained from Bangor, Me. There is very little about the variety, however, either in tree or fruit to suggest that it is of crab parentage. On the other hand, it is said that some of its seedlings show crab characteristics. This would appear to give some support to the claim regarding its parentage.

It is one of the most important late fall and early winter varieties in the upper Mississippi Valley, where cold endurance of the tree is of paramount importance. In recent years it has become quite widely disseminated. It has been planted considerably in the New Jersey section, though rarely elsewhere in this region. It is becoming an important variety here to supplement the earliest ripening sorts.

The tree grows well, with rather long slender branches when young. The foliage is sometimes rather small and weak, though apparently not especially subject to fungous diseases. The fruit is medium to large; roundish oblate; yellowish white under color, heavily striped and splashed with red when well colored; flesh tender, juicy, subacid; quality very good; desirable either for cooking or dessert. In the New Jersey section it is fully ripe from the latter part of August to the first of September, but the variety usually bears heavily and the fruit develops to a sufficiently large size for culinary purposes relatively early. Hence marketing of the green fruit begins frequently the last of July or the first of August, the picking being so done as to thin the fruit on the overloaded trees. By such methods the green fruit is made a source of some revenue, and that which is allowed to remain until later is improved as a result of the thinning. In this way the fruit may be handled throughout the month of August. The variety is generally regarded by those who have it in the New Jersey section as a very desirable and profitable sort to grow.

Williams. Synonyms: *Williams Early*, *Williams Red*, *Williams Early Red*, *Williams Favorite*.

This variety has been in cultivation since about the middle or latter part of the eighteenth century. It originated at Roxbury, Mass., and was first exhibited in 1830 at a meeting of the Massachusetts Horticultural Society. It is grown considerably in the North and East and to a lesser extent in some other sections.[a]

[a] For further historical information and a detailed description of this variety, see the Yearbook of the United States Department of Agriculture for 1908, p. 476.

Its distribution is general throughout the sections of this region in which the commercial growing of early apples has become important, particularly in Delaware and New Jersey. In the North Carolina section it is occasionally found, but is not of special importance at present.

The tree is rather a poor grower in the nursery as well as in the orchard, making a spreading, often rather irregular, top. (See fig. 7.) Probably top working on some vigorous upright grower such as the Northern Spy would be an advantage. Early and abundant crops are generally produced. The crops are more or less alternate under indifferent cultural conditions, but with good attention considerable fruit may be expected nearly every year. The fruit is above medium in size; roundish oblong, conic; when well colored, heavily striped with dark red or crimson, becoming nearly a solid color; subacid; quality good. The season in the New Jersey and Chesapeake

FIG. 7.—A Williams apple tree in Delaware, about 10 years old.

peninsula sections usually begins about July 20, varying from this date a few days in different years, according to climatic and other conditions. The market period generally lasts about two weeks.

Some varieties, as noted elsewhere, are handled as soon as they are large enough to cook, but this one though it develops to a fairly good size is not marketed, as a general practice, until it is well colored. In fact, its fine color is one of its most attractive features. Ripening is quite irregular, so that picking is rather difficult, especially from large trees. As the fruit drops soon after attaining full color, some growers allow it to remain on the trees until it matures and drops instead of picking it by hand. (See Harvesting, p. 20.)

On account of its season of ripening, the fruit sometimes reaches the markets when they are well stocked with peaches, cantaloupes, and other fresh fruits. The prices of apples are more or less influenced thereby. Yet because of the many desirable

market qualities which this variety possesses it is very satisfactory as a rule and more profitable than most of the second early sorts. It is one of the comparatively few varieties that are grown in large quantities. An occasional adverse report is heard relative to its behavior in these sections, but they are so exceptional that they do not materially affect the general standing of the variety.

There is apparently confusion in some sections of this region in connection with this variety. In the above-mentioned sections where it is commercially important it is perhaps better known by its synonyms Williams Early or Williams Early Red than by its approved name. In other sections it is commonly called by another synonym, Williams Favorite. Occasional statements are made in this region, however, that Williams Early Red and Williams Favorite are distinct varieties, the former being a scraggly, poor grower, but a good bearer; the latter, a strong, vigorous upright tree, but a shy bearer and not commonly grown.

Since the apple known to the growers of this region as Williams Early or Williams Early Red is undoubtedly Williams, as above described, considerable effort has been made to determine the identity of the variety known in this region as Williams Favorite. Though the latter variety is commonly spoken of, few growers are actually familiar with it, and it has been difficult to locate bearing trees. It appears probable, however, that the Williams Favorite of some, at least, is the Sops-of-Wine, as it has recently been determined that the latter variety has been disseminated somewhat under the name Williams Favorite, which name has been erroneously used as a synonym of that variety. Some young trees planted for Williams Favorite (of this region) and which correspond in tree characters to this variety, as above described, have been identified as Sops-of-Wine. While this still leaves the matter open to some doubt, it at least is a partial clearing up of the confusion. There may be still other varieties not yet examined in this connection which are being grown under the name Williams Favorite.

Yellow Transparent. Synonym: *Government List No. 334.*

As the synonym of this variety implies, this is one of the importations from Russia made by the United States Department of Agriculture in 1870. It has been widely disseminated, being now grown in many parts of the country. It possesses an unusually wide range of adaptability, as is evident from the high degree of success with which it is grown in many sections.

In this region it is one of the most important early varieties. It is more extensively grown in Delaware than in any other section, but it is being planted throughout the region.

Under high culture the tree makes a fairly strong upright growth for the first few years (Pl. I), but in many orchards the growth is rather short and stubby. This gives the tree a somewhat stunted appearance. Closer planting is possible than with most varieties on account of the small size of the tree. Frequently a few apples are borne the first year after the trees are planted, and often when 2 and 3 years old considerable fruit will set. Full bearing is reached at an early age. Nearly annual and fairly abundant crops may be expected in this region under good cultural conditions.

The tree sometimes twig-blights rather badly, though in some orchards it seldom appears. It is considered short lived, but because of its early-bearing proclivities and abundant crops, longevity is not so important a matter as with some other varieties. The fruit is above medium size; roundish conic; beautiful, clear yellowish white, the skin having a waxy appearance; subacid; good to very good.

In the Chesapeake peninsula section shipments frequently are made the latter part of June, often as early as the 20th to the 25th of the month. But at this time the fruit is rather immature and small. By the first week in July it is usually in prime condition for shipping from this section, and by the 10th to the 15th of July it is generally all marketed. Some growers, however, ship the fruit in a more immature condition than

others, and this makes the shipping dates of one orchard differ accordingly from those of another in the same locality. In the New Jersey section the tendency is to let the fruit reach a somewhat more mature condition than is customary in the Chesapeake peninsula section, hence shipping dates are relatively later in the former section. In the Virginia and North Carolina sections the season begins from the 10th to the 20th of June. Ripening is quite uniform, so that the entire crop can usually be harvested in two pickings. If conditions are favorable for growth after the first picking is made, the fruit which is allowed to remain on the trees will develop rapidly in size so that the second picking usually comprises the best grade of fruit produced. Formerly the Yellow Transparent was considered too tender for a market variety, but experience has demonstrated that with reasonable care in handling, especially if the fruit is picked while it is still firm, fairly long-distance shipments can be safely made if the packing is well done. In some of the experimental export shipments made by the Bureau of Plant Industry this variety carried in good condition, in cold storage, to the English markets.

As mentioned under Thaler, the fruit of Yellow Transparent very closely resembles that variety, Thaler possibly being a few days later, and the tree rather more vigorous than Yellow Transparent.

PROMISING VARIETIES FOR TRIAL.

There are a number of varieties of summer apples of considerable prominence in other sections that, so far as observed, are not being grown in this region but which would doubtless be of value both commercially and for home use. Some of the more promising of these are the following:

Coffman.

This variety has been known for many years in some sections of Tennessee, particularly in Lauderdale County. It was named for the owner of the farm on which one of the first trees of it to attract attention stood. It was propagated and introduced to the trade in 1888. It is not widely known among fruit growers.[a]

It is a vigorous, upright grower and produces regular annual crops. The fruit is of the Red June type and it may be a seedling of that variety; medium or above in size; roundish; under color yellow, washed with mixed red and stripes of purplish red, turning to almost a black-red when highly colored; subacid; good to very good. It is said to ripen about with Red June.

On account of the value of the Red June apple and others of its type in some sections of this region, and the similarity of Coffman to that variety, it is considered worthy of extended trial here.

Early Cooper. Synonym: *Cooper's Early White.*

There is much uncertainty in regard to the place of origin of this variety. By some it is thought to have come from Iowa, but the evidence is not conclusive. It is grown to a considerable extent in some parts of the Middle West. In some sections of Kansas and Oklahoma it is very successful.

The tree is an exceptionally fine stocky grower, bears early, and is productive. The fruit is medium size; round or roundish oblate; clear greenish yellow; quality good. It is considered especially desirable for cooking, while its firm texture makes it a satisfactory sort for shipping. Probably it could be marketed from the central sections of this region by the last of July.

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[a] For further historical information and a detailed description of this variety, see the Yearbook of the United States Department of Agriculture for 1909, p. 377.

Summer Extra.

This variety probably originated as a chance seedling near Quincy, Ky. It is not known generally to fruit growers.

The tree is a strong, handsome grower, bears early, and is prolific in sections where it is in cultivation. The fruit is medium to large in size; roundish; yellow with blush on exposed side; pleasant subacid; dessert quality good to very good. For cooking it is said to be especially fine. It would probably ripen at central points in this region during the last of July or early August.

Summer Rambo.

The origin of this variety is uncertain, though it is commonly supposed to have come from southeastern Pennsylvania, but no definite information appears to be obtainable.

Several other varieties, notably Summer Rambour, or Rambour d'Ete, an old French variety that was formerly grown more or less in this country, Grosh, and Western Beauty have been confused with this one. But it is pretty definitely determined that these are all distinct varieties, though possessing some rather strong points of similarity.

Though not found growing in this region in the present connection, the Summer Rambo is often sold in local markets from orchards in the Maryland and Virginia sections of the adjacent region.

The tree is a strong vigorous grower and an early and abundant bearer. The fruit is described in considerable detail as follows: Form oblate; size large; cavity wide, large, deep, slope gradual; basin regular, medium, slope gradual; surface moderately smooth, some erupted russet dots; color yellow, lightly washed with pale mixed red, a few bright-crimson splashes and broken stripes; dots numerous, russet, many erupted; skin thick, tenacious; flesh yellowish, texture fine grained, breaking, juicy; core oblate, clasping, medium to small in size; flavor subacid, rich; quality good to very good. In the vicinity of Washington, D. C., the fruit is ripe soon after the middle of August. It is apparently worthy of attention in the Coastal Plain region both for commercial purposes and for home use.

Wilson June.

The Wilson June variety, as nearly as its history can be traced, came from a nursery in Washington County, Ark., that was abandoned during a portion of the civil war period. The trees were subsequently dug and planted in local orchards. The original tree was probably one that was obtained from this source.

The fruit is distinctly of the Red June type, though considerably larger than that variety and sweet in flavor. The tree is thrifty and apparently a good bearer. For many years it has been grown locally to a very limited extent, but during the past few years it has been attracting some attention and has been propagated more extensively than formerly.

Though the range of its adaptability has not been determined, it is likely that wherever the Red June can be grown successfully this variety may prove to be of value when a sweet apple is desired.

OTHER VARIETIES.

In the course of these investigations a considerable number of other varieties than those mentioned have come under observation or have been reported by growers in the interviews had with them by the writer. For various reasons it is not practicable to discuss each of these separately. In some cases the varieties are practically unknown in the region and apparently are not well adapted to the

conditions or possess such characteristics as to render them of no apparent value to the fruit interests of this region. In still other cases the varieties are local and relatively unimportant. For these and other similar reasons it has seemed best to confine the discussion largely to varieties which are of value and to certain other varieties that apparently possess little or no merit but which sooner or later are likely to come to the attention of fruit growers in this region for consideration. A few other sorts not now in cultivation in this region so far as known but which are considered promising are also discussed.

In this connection there are one or two varieties, or possibly more, grown largely in a local way in the North Carolina section of this region which should be mentioned here. These are variously known as "Early May," "White May," "June Apple," etc., and ripen the last part of May or early in June.

It is possible that some of these very early sorts may prove to be White Juneating, an old English variety that was more or less grown in the South in the early years under various names.

SUMMARY OF VARIETIES.

As a means of indicating the relative importance of the different varieties referred to in the foregoing pages in the different sections of this region and the approximate time when the season of use begins, the following table has been prepared. In the column which follows the varietal names the use to which each sort is adapted is indicated by the initial letters *d*, *k*, and *m*, either singly or in combination, as is required. Varieties of special value for eating in a fresh state are designated by *d* for "dessert;" *k* signifies "kitchen" or culinary use; *m*, that the variety is suited for market purposes.

In the columns headed "Relative importance" the comparative extent to which the several varieties are grown in the different sections is shown. The varieties rated 1 are those which are grown the most extensively in the sections so designated; varieties marked 2 are grown to some extent in the sections so marked, but not so extensively as those rated as 1; varieties which are found only occasionally, hence relatively unimportant at present, are rated as 3.

Promising varieties which are at present grown but little and the value of which is not yet fully determined are grouped together and follow Table III. It should be further stated that where a variety is rated the same in a section in which early-apple culture is an important industry and one in which it is still undeveloped commercially it does not mean that that variety is of equal importance in the two sections on the basis of the quantity of fruit produced, but rather that in comparison with other varieties grown in the respective sections the relative proportions are approximately the same.

The dates given in the columns headed "Season begins about" refer to the approximate periods when the different sorts are fit for use or can be marketed, and not necessarily to the date of full maturity. Where the 15th of a month is stated, it should be broadly interpreted to mean the middle of the month; likewise the 25th refers to the last of a month rather than to an exact date. A similar interpretation should be given to other dates mentioned.

TABLE III.—*Use, relative importance, and season of edible maturity of summer-apple varieties suited to growing in the Middle Atlantic States.*

Variety.	Use.	New Jersey section.		Chesapeake peninsula section.		Virginia section.		North Carolina section.	
		Relative importance.	Season begins about—	Relative importance.	Season begins about—	Relative importance.	Season begins about—	Relative importance.	Season begins about—
Alexander	km	3	July 25						
Bachelor Blush	km	3	Aug. 25						
Benoni	d	3	Aug. 20			3	July 10		
Bonum	d					3	Sept. 1	1	Aug. 25
Bough	d	2	July 10	2	July 10				
Celestia	dkm			3	Sept. 5	3	Sept. 1		
Champlain	km	2	July 25	2	July 25				
Colton	km			2	July 10				
Cornell	d	3	Aug. 15						
Early Edward	d	3	July 25	3	July 25				
Early Harvest	dk	2	July 5	2	July 5	1	June 25	1	June 15
Early Joe	d	3	July 25	3	July 25				
Early Ripe	km			1	July 1			3	June 15
Early Strawberry	d	2	July 15	2	July 15				
English Codlin	km	2	July 25						
Fanny	k	3	...do	3	July 25				
Golden Sweet	dk			3	...do			3	July 15
Gravenstein	dkm	1	Aug. 5	1	Aug. 5	1	July 25		
Horse	k							1	July 15
Jefferis	d			3	Aug. 1	3	July 25		
Jersey Sweet	d			3	Aug. 15	3	Aug. 10		
July	km			1	July 10				
Keswick	km	3	July 25						
Lowell	dk	3	Aug. 1						
Maiden Blush	km	1	Aug. 15	1	Aug. 10	1	Aug. 1		
Metz	k							2	July 25
Oldenburg	km	2	July 20	2	July 20	3	July 15		
Orange Pippin	km	3	July 25						
Primate	d	3	July 15						
Randolph	km			2	July 20				
Red Astrachan	km	1	July 10	1	July 5	1	July 1	1	June 25
Red June	dm			2	July 10	1	...do	1	June 15
Roadstown	km	2	Aug. 1						
Smokehouse	dkm	3	Sept. 10			1	Sept. 1		
Starr	km	1	July 15						
Summer Hagloe	km	1	July 20	1	July 20				
Summer Rose	d	3	July 15	2	July 10				
Tetofski	km	3	...do	3	July 15				
Wealthy	dkm	2	Aug. 1						
Williams	dkm	1	July 20	1	July 20			3	July 1
Yellow Transparent	dkm	1	July 5	1	July 1	1	June 20	1	June 10

In Table III several varieties are rated as of first importance in either the New Jersey or the Chesapeake peninsula section, but are not mentioned as being grown at all in either of the other sections. The conditions in each section are sufficiently similar to suggest the probability that a variety which can be grown with a high degree of success in any one of them is at least a promising sort for trial in all of the others. The varieties referred to in this connection can be readily determined by reference to the above table.

Several sorts rated as 2 or 3 in the sections in which they are grown appear to possess sufficient merit for their season of ripening to warrant a more general planting of them. The more important of these varieties are Bachelor Blush, Celestia, English Codlin, Oldenburg, Primate, Roadstown, Smokehouse, and Wealthy.

In the discussion of varieties a number of sorts are mentioned which appear to be promising, but which are not sufficiently well known in these sections for them to have any particular rating in comparison with other varieties. A number of varieties are also included in the varietal discussion which are not in cultivation in any section of this region so far as is known, but which are sufficiently promising in other sections to suggest the probability of their being successfully grown in this region. These two groups of varieties comprise the following: Coffman, Cross, Dawes, Early Cooper, Glowing Coal, Hawthornden, Kane, Muster, Sandbrook, Summer Extra, Summer King, Thaler, Townsend, and Trenton Early.

PHENOLOGICAL RECORDS.

CHARACTER OF DATA.

Exact dates of the blossoming of varieties, the opening of the leaves, the ripening periods of the fruit, and its keeping qualities in different sections furnish valuable means for studying the adaptability of varieties when such data are accompanied by sufficient information concerning the age and condition of the trees or plants in question and the conditions under which they are grown. The latter should include climatological data.

Information regarding environment is essential to a correct interpretation of the varietal data just mentioned and also in order to make the data from one section fully comparable with those from another. The correlation of climatic and varietal data constitutes one feature of the science of phenology (a contraction of the word phenomenology). This science treats of the relationships of local climatic conditions and the periodical recurrence of the phenomena of plant life or, in a broader sense, of all living things, both plants and animals.

The phenological data presented in Table IV, relating to apples in New Jersey, Maryland, Delaware, Virginia, and North Carolina, recorded under the direction of the Bureau of Plant Industry by a large number of fruit growers located in different sections of these States, are appended for the purpose not only of disseminating the specific varietal information which has thus been recorded, but also because such data make possible comparisons with other sections from which important deductions may be made.

That these comparisons and deductions may be as complete and far-reaching as possible, the important varieties of apples of all

seasons grown in these States are included, as well as the early-ripening ones to which the subject-matter of the foregoing pages relates. For a similar reason, the range of observations includes the entire States, of which the region under discussion in the earlier pages forms a part.

The climatological tables on pages 13 to 15, for the years 1902 to 1907, inclusive, which correspond to the years covered by the phenological data below, should be carefully consulted in studying these data, since the latter are governed largely by the prevailing climatic conditions.

A list of the names and addresses of those who have contributed the data presented in Table IV is given below. Each observer is assigned a number. These appear in the first column in the list in numerical order. For convenience in indicating the approximate geographical location where the different records were made, the number representing the observer who made each one is placed before it in Table IV in the column headed "Observer's No."

The sequence of arrangement in Table IV is by States, from south to north; under each State, it is alphabetically by counties, as are also the names of the post-offices and observers in each county. The order of the observations on each variety is also from south to north, in accordance with the approximate latitude at which each observation was made.

PHENOLOGICAL OBSERVERS.

In the following list are included the names and post-office addresses of the fruit growers who have furnished the phenological data presented in this bulletin:

List of observers who have furnished the phenological data included in this bulletin.

NORTH CAROLINA.

Observer's No.	Grower.	Post-office.	County.
1	J. C. Cowan	Asheville	Buncombe.
2	T. P. Gaston	Candler	Do.
3	F. B. Barnhardt	Concord	Cabarrus.
4	J. A. Dula	Lenoir	Caldwell.
5	J. Hatley	Sawmill	Do.
6	J. S. Breece	Fayetteville	Cumberland.
7	M. L. Furr	Mount Holly	Gaston.
8	J. J. Phoenix	Greensboro	Guilford.
9	John Farrior	Waynesville	Haywood.
10	G. D. Green	do	Do.
10*a*	do	do	Do.
10*b*	do	do	Do.
10*c*	do	do	Do.
10*d*	do	do	Do.
11	C. Oates	Bear Wallow	Henderson.
12	J. F. Livingston	Fletcher	Do.
13	Mark Moore	Horseshoe	Do.
14	J. D. Woody	Wilmington	New Hanover.
15	W. T. Lindsey	Tryon	Polk.
15*a*	J. F. Davenport	Cherry	Washington.
16	J. L. Kincaid	Boone	Watauga.
17	C. G. Hodges	Sands	Do

List of observers who have furnished the phenological data included in this bulletin—Con.

VIRGINIA.

Observer's No.	Grower.	Post-office.	County.
18	J. E. Smith	Cismont	Albemarle.
19	Walter Whately	Crozet	Do.
20	J. W. Apperson	Yancey Mills	Do.
21	T. J. Cunningham	Amherst	Amherst.
22	W. F. Gilkeson	Fishersville	Augusta.
23	H. F. Deffenbaugh	Staunton	Do.
24	J. D. Keeler	Bedford City, R. F. D	Bedford.
25	J. D. Lowry	do	Do.
26	J. F. Deboe	Bodycamp	Do.
27	W. H. Taylor	Colemans Falls	Do.
28	T. J. Holdren	Thaxton, R. F. D	Do.
29	M. L. Hatcher	Penicks, R. F. D	Do.
30	R. L. Dearing	Stewartsville	Do.
31	C. E. Layman	Troutville	Botetourt.
32	E. W. Byrd	Berryville	Clarke.
33	Hampton Agricultural and Normal Institute.	Hampton	Elizabeth City.
34	E. B. Whaley	Pender	Fairfax.
35	J. A. McLaughlin	Morrisville	Fauquier.
36	Joseph Wetsel	Wetsels	Greene.
37	A. B. Davis	Purcellville	Loudon.
38	H. L. Price	Blacksburg	Montgomery.
39	J. C. Carmody	Christiansburg	Do.
40	J. J. Shoemaker	do	Do.
41	W. B. MacGregor	Avon	Nelson.
42	Withers Massie	Massies Mill	Do.
43	R. L. Hughes	Nellysford	Do.
44	J. E. Purvis	Oakridge	Do.
44*a*	W. M. Boyd	Roseland, R. F. D	Do.
45	James Dickie	do	Do.
46	E. W. Rogers	Jennings	Nottoway.
47	Geo. W. Via	Woolwine	Patrick.
48	J. B. Johnson	Manassas	Prince William.
49	R. C. Booth	Dublin	Pulaski.
50	C. H. Constable	Warsaw	Richmond.
51	J. Coles Terry	Bent Mountain	Roanoke.
52	E. L. Wright	Vinton	Do.
53	W. J. Cowger	Dayton	Rockingham.
54	G. A. Copp	Strasburg	Shenandoah.
55	J. H. Pifer	do	Do.
56	L. B. Moore	Arco	Warren.

MARYLAND.

57	Saml. Garner	Annapolis	Anne Arundel.
58	Jesse Smith	Linwood	Carroll.
59	Geo. Balderston	Colora	Cecil.
60	W. R. Grosh	Elkton	Do.
60*a*	do	do	Do.
61	J. M. Andrews	Hurlock	Dorchester.
62	C. L. Vail	Forest Hill	Harford.
63	Thomas Tobin	Harford Furnace	Do.
64	L. E. Hollingsworth	Joppa	Do.
65	J. S. Harris	Worton, R. F. D	Kent.
66	F. H. Harper	Stillpond	Do.
67	W. S. Maxwell	do	Do.
68	R. B. Thomas	Ednor	Montgomery.
69	W. I. Walker	Millington	Queen Anne.
70	Frisby Smith	Hancock	Washington.
71	F. E. Matthews	Pocomoke City	Worcester.

DELAWARE.

72	F. C. Bancroft	Camden	Kent.
73	C. G. Brown	do	Do.
74	E. G. Packard	Dover	Do.
75	John Heyd	Felton	Do.
76	F. M. Soper	Magnolia	Do.
77	S. H. Derby	Woodside	Do.
78	G. B. Graeff	Bridgeville	Sussex.

List of observers who have furnished the phenological data included in this bulletin—Con.

NEW JERSEY.

Observer's No.	Grower.	Post-office.	County.
79	T. Chalmers	Folsom	Atlantic.
80	A. Hansell	Burlington	Burlington.
81	W. P. Pray	Dobbins	Do.
82	J. S. Collins	Moorestown	Do.
83	S. C. De Cou	do	Do.
84	G. L. Gillingham	do	Do.
85	A. L. Ritchie	Riverton	Do.
86	H. G. Taylor	do	Do.
87	H. L. Sabsovich	Woodbine	Cape May.
88	G. W. Gould	Montclair	Essex.
89	A. T. Repp	Glassboro	Gloucester.
90	C. G. Kirby	Mullica Hill	Do.
91	S. S. Budd	Thorofare	Do.
92	J. F. Brown	Princeton	Mercer.
93	H. E. Hale	do	Do.
94	I. J. Blackwell	Titusville	Do.
95	J. T. Robbins	Allentown	Monmouth.
96	W. H. Reid	Tennet	Do.
97	C. M. Rorer	Cassville	Ocean.
98	W. H. Skillman	Bellemead	Somerset.
99	A. F. Randolph	Boundbrook	Do.
100	W. J. Logan	Somerville	Do.
101	W. S. Little	Sussex	Sussex.
102	A. A. Miller	do	Do.
103	H. B. De Kay & Son	Vernon	Do.
104	M. E. Vass	Blairstown	Warren.

194

TABLE IV.—*Phenological records—Apples.*

ARKANSAS. Synonym: *Mammoth Black Twig.*

Observer's number.	State.	Approximate latitude.	Elevation (feet).	Slope.	Soil.	Year.	Age of tree (yrs.).	Date first bloom.	Date full bloom.	Date last spring frost.	Date leaf buds begin to open.	Date terminal buds begin to form.	Date picked (first picking).	Date first fall frost.	Date fit for use.	Keeps until—
		° ′														
32	Virginia	37 0	5	SW.	Sandy loam	1903	7	Apr. 10	Apr. 18	Apr. 5	Apr. 25	June –		Oct. 27		
33	do	37 0	5	SW.	do	1904	8	Apr. 22	Apr. 30	Apr. 20	Apr. 5	June 23	Sept. 15	Oct. 17	Oct. 1	Oct.
38	do	37 15	2,170	NW.	Limestone clay	1902	13	Apr. 26	May 3	Apr. 8	Apr. 10			Sept. 24		
38	do	37 15	2,170	NW.	do	1903	14	Apr. 10	Apr. 18	Apr. 5	Mar. 27		Oct. 1	Sept. 14		Mar.
38	do	37 15	2,170	NW.	do	1904	15	May 2	May 7	May 16	Apr. 19	June 20		Oct. 15		
28	do	37 20	1,000	N.	Sandy loam	1904	5	May 10	May 16	May 7			Oct. 20		Oct. 20	Late.
28	do	37 20	1,000	N.	do	1907	8	Mar. 27	Apr. 24	Mar. 7	Mar. 20	June 18	Oct. 8		Oct. 25	Do.
31	do	37 25	1,400	NW.	Gravelly loam	1902	6	Apr. 20	do	Apr. 8	Apr. 20	July –	Sept. 25		Oct. –	Do.
54	do	39 0	1,000	NE.	Sandy loam	1903	10	Apr. 10	Apr. 22	Apr. 5	Apr. 1	June 10	Oct. 1		Dec. 6	June.
68	Maryland	39 10	550	S.	Porous clay	1906	9	Apr. 19	Apr. 30	May 10	Apr. 14		Oct. 10	Oct. 12	Jan. 1	Do.
90	New Jersey	39 45	125	SW.	Gravelly	1907	10	May 6	May 12	Apr. 21						Late.
83	do	39 55	50	None.	Sandy	1906		Apr. 24	May 8							
83	do	39 55	50	None.	do	1907		May 6	May 3							

BALDWIN.

4	North Carolina	35 50	1,200	S.	Sandy loam	1904	20	Apr. 15	May 1				Sept. –		Aug. –	Sept.
4	do	35 50	1,200	S.	do	1905		do							do	
47	Virginia	36 45	1,600	S.	Porous loam	1905	10	May 1	May 10	May 1						
38	do	37 15	2,170	NW.	Limestone clay	1902	13	Apr. 28	May 2	Apr. 18	Apr. 8			Oct. 14		
38	do	37 15	2,170	NW.	do	1903	14	Apr. 16	Apr. 26	Apr. 5	Mar. 27		Sept. 15	Sept. 14	Oct. 1	Nov.
38	do	37 15	2,170	NW.	do	1904	15			May 16	Apr. 22	June 20		Oct. 15		
29	do	37 20	1,200	SE.	Porous loam	1903	10	Apr. 4	Apr. 10	Apr. 6	Apr. 12		Sept. 10		Aug. 1	Dec.
27	do	37 30	1,000	NE.	Clay loam	1902	26	Apr. 18	Apr. 21	Mar. –	Apr. 9		Sept. 20	Nov. –	Oct. –	Do.
36	do	38 15	650		Sandy loam	1902	18	do	do	May 3	Apr. 20			Oct. 17		
53	do	38 25	1,400	W.	Gravelly loam	1903	17	Apr. 11	Apr. 20		Apr. 9		Sept. –		Nov. –	Jan.
53	do	38 25	1,400	W.	do	1904	18	Apr. 20	Apr. 26		Apr. 3		do	Oct. –	Sept. –	Do.
53	do	38 25	1,400	W.	do	1906	20	Apr. 26	May 2	May 11	Apr. 17		do	Oct. 12	do	Dec.
35	do	38 30	400	NE.	Cecil clay	1902	5	May 4	May 8	Apr. 15	Apr. 16	Aug. 22		Oct. 22		
35	do	38 30	400	NE.	do	1903	6			Apr. 5	Mar. 22	Aug. 1		Oct. 18		
35	do	38 30	400	NE.	do	1904	7			Apr. 23	Apr. 7	July 19		Sept. 23		
35	do	38 30	400	NE.	do	1905	8	Apr. 17	Apr. 22	Apr. 20	Mar. 31	July 10	Sept. 10	Oct. 13		
35	do	38 30	400	NE.	do	1906	9			May 10	Apr. 16	July 26		Oct. 12		
48	do	38 45	375	SE.	Porous loam	1903	15	Apr. 9	Apr. 12	Apr. 5	Apr. 15	June 30	Aug. 20	Oct. 25	Oct. 20	Nov.
48	do	38 45	375	SE.	do	1905	17	Apr. 20	Apr. 24		Apr. 20					

TABLE IV.—*Phenological records—Apples*—Continued.

BALDWIN—Continued.

Observer's number.	State.	Approximate latitude.	Elevation (feet).	Slope.	Soil.	Year.	Age of tree (yrs.).	Date first bloom.	Date full bloom.	Date last spring frost.	Date leaf buds begin to open.	Date terminal buds begin to form.	Date picked (first picking.)	Date first fall frost.	Date fit for use.	Keeps until—
		° ′														
48	Virginia	38 45	375	SE.	Porous loam	1906	33	Apr. 25	Apr. 27	May 11	May 1			Oct. 11	Aug. 20	Nov.
48	do	38 45	375	SE.	do	1907		Apr. 26	Apr. 28	Apr. 20			Sept. 20	Oct. 13		Do.
56	do	38 50	950	NW.	Porous clay	1907	10	Apr. 15	Apr. 25	Apr. 10	Apr. 15	Apr. 25	Sept. 1			Jan.
54	do	39 0	1,000	NE.	Porous loam	1902	8	Apr. 24	Apr. 29	Apr. 14	Apr. 16	June 15	Sept. 20		Sept. 20	
54	do	39 0	1,000	NE.	do	1903	9	Apr. 18	Apr. 24	Apr. 5	Apr. 1	June 10	Sept. 10		do	Dec.
54	do	39 0	1,000	NE.	do	1904	10	May 6	May 10	Apr. 20	Apr. 30	do				
54	do	39 0	1,000	NE.	do	1905	11	Apr. 24	Apr. 29	Apr. 19	Apr. 11	do	Sept. 20			
54	do	39 0	1,000	NE.	do	1906	18	Apr. 26	Apr. 30	May 8	Apr. 18	do	Sept. 25		Oct. 1	Mar.
54	do	39 0	1,000	NE.	do	1907	19	Apr. 25	do	Apr. 23	Apr. 3	June 15	Oct. 1		Dec. –	June.
72	Delaware	39 10	70	None.	Sandy loam	1902	30	do	Apr. 28				Sept. 30	Oct. 20	Nov. 1	
73	do	39 10	70	None.	do	1902	20	Apr. 28	May 4		Apr. 12		Sept. 1		Sept. 15	Nov.
64	Maryland	39 25	225		Stony loam	1905	40	Apr. 23	Apr. 28	Apr. 19	Apr. 23	Sept. 1	Sept. 15	Oct. 19	Sept. 1	Jan.
64	do	39 25	225		do	1906	60	Apr. 29	May 3	May 10	Apr. 30	Aug. 30		Oct. 11		
63	do	39 30	150	N.	Clay loam	1907	20	May 1	May 8	May 12	Apr. 16	Aug. 6	Oct. 8	Oct. 15	Sept. 15	Mar.
62	do	39 35	500	E.	Loam	1905	45	Apr. 26	May 4				Oct. 15		Dec. 15	
62	do	39 35	500	E.	do	1906		Apr. 28	May 2	May 11			Oct. 1			
60	do	39 35	75	SW.	Heavy loam	1902	10	Apr. 30	do	May 28	Apr. 25	July 15	Sept. 15	Nov. 15	Late	
60	do	39 35	75	SW.	do	1904	12	May 7	May 10	May 11	Apr. 30	June 29	Oct. 5	Sept. 17		
79	New Jersey	39 35	90	NW.	Gravelly loam	1902	50	Apr. 24	Apr. 29	Apr. 15	Apr. 20		Sept. 15	Oct. 22	Sept. 15	
89	do	39 40	150	None.	Porous loam	1904	27	May 6	May 10	Apr. 17	May 2	June 15	do	Sept. 25	Jan. 1a	
90	do	39 45	125	SW.	Gravelly	1907	10	do	do	Apr. 21						
91	do	39 50	150			1906	35	Apr. 22	May 1		Apr. 14	July 20	Oct. 15		Sept. 10	Feb.
83	do	39 55	50	None.	Sandy loam	1902	20	Apr. 24	Apr. 30							
80	do	40 5	50	N.	Porous loam	1904	35	May 7	May 9	Apr. 24		June 1	Sept. 25	Oct. 10	Sept. 10	Apr.
80	do	40 5	50	N.	do	1905	50	Apr. 30	May 5	Apr. 19	Apr. 20	June 7	Sept. 28	Oct. 15		Do.
80	do	40 5	50	N.	do	1907	40	May 6	May 14	Apr. 20	Apr. 10	June 20	Oct. 4			
96	do	40 15	90	N.&S.	Clay loam	1904	25	May 9	do		May 6		Sept. 14	Sept. 17	Sept. 14	Jan.
96	do	40 15	90	N.&S.	do	1905	26	May 1	May 8		Apr. 20		Sept. 12	Oct. 18	Sept. 15	Do.
96	do	40 15	90	N.&S.	do	1906	27	do	do		do		do		Sept. 12	Do.
92	do	40 15	200	S.	do	1906	35	Apr. 26	May 4	May 10			Oct. 15	Oct. –	Oct. 15	Feb.
92	do	40 15	200	S.	do	1907	36	May 10	May 15	May 22	Apr. 27	June 12	Oct. 1		Dec. –	Do.
94	do	40 20	125	SW.	Sandy loam	1902	38	Apr. 29	May 4	Apr. 28	Apr. 20	June 27	do	Oct. 10	Sept. 20	Sept.
94	do	40 20	125	SW.	do	1904	40	May 7	May 11		Apr. 28	July 16	Sept. 1	Sept. 20	Sept. 10	Do.
94	do	40 20	125	SW.	do	1905	41	May 2	May 7	Apr. 19			Sept. 15		Sept. 1	Oct.
94	do	40 20	125	SW.	do	1906	42	do	May 9	May 12	Apr. 20	June 5	Sept. 20			
94	do	40 20	125	SW.	do	1907	43	May 13	May 16		Apr. 27	July 4	do	Oct. 20	Oct. –	Oct.
99	do	40 35	40	NW.	do	1907		May 10		May 12	May 1		Oct. 15	Oct. 5		Jan.
100	do	40 35	600	N.	Clay loam	1903	19	Apr. 22			Apr. 7					

100	do	40	35	600	W.	do	1904	20	May 8	May 16	Apr. 22	May 1						
88	do	40	50	500	E.	Sandy loam	1907	16	do	May 12	Apr. 25	May 14		Oct. 15	Oct. 10	Nov. 25	Mar.
104	do	41	0	600	None.	Clay loam	1904	12	May 11	May 16	Apr. 23	May 2	July 2	Oct. 8	Sept. 22	Jan. –	Do.
104	do	41	0	600	None.	do	1905	14	May 7	May 11	Apr. 24	Apr. 25	July 3	Oct. 5	Oct. 22	Dec. –	Apr.
104	do	41	0	600	None.	do	1906	15	May 9	May 14	May 11	Apr. 22	July 2	Oct. 8	Oct. 12	do	Mar.
104	do	41	0	600	None.	do	1907	16	May 15	May 20	May 12	Apr. 27	July 3	Oct. 15	Oct. 25	do	Apr.
101	do	41	10	550	SE.	Gravelly	1904	11	May 8	May 18	Apr. 23	Apr. 30			Sept. 22		
102	do	41	10	800	None.	Sandy loam	1904	25	May 12	do							
102	do	41	10	800	None.	do	1905	26	May 7	May 12						Dec. –	Apr.
103	do	41	15	400	SW.	do	1904		May 12	May 18	May 5			Sept. 1			

BEN DAVIS.

6	North Carolina	35	5	200	None.	Sandy	1902		Apr. 6	Apr. 18		Mar. 23						
6	do	35	5	200	None.	do	1904		Mar. 23	Mar. 31								
7	do	35	20	700	None.	Loam	1905	10	Mar. 25	Apr. 5	Apr. 17	Mar. 18			Oct. 11			
11	do	35	25	1,990	SE.	Porous loam	1904	15	Apr. 30	May 5	Apr. 21	May 5		Sept. 23	Oct. 24	Nov. 1	Jan.	
11	do	35	25	1,990	SE.	do	1905	12	May 1	May 10	May 6	May 10		Sept. 5	Oct. 18			
11	do	35	25	1,990	SE.	do	1906	20	Apr. 12	Apr. 20	May 10	Apr. 5		Oct. 10	Oct. 10	Nov. 1	Jan.	
11	do	35	25	1,990	SE.	do	1907	9	Apr. 4	Apr. 30	Apr. 2	Apr. 20					Mar.	
12	do	35	25	2,128	W.	do	1902	18	Apr. 26	May 2	Apr. 5	Apr. 23	July 1	Sept. 20	Oct. 15	Oct. 1	Feb.	
12	do	35	25	2,128	W.	do	1903	19	Apr. 11	Apr. 16	Apr. 6	Apr. 24						
12	do	35	25	2,128	W.	do	1904	20	Apr. 20	May 2	Apr. 11	May 14	Aug. 8	Oct. 1	Oct. 15	Nov. 15	Feb.	
12	do	35	25	2,128	W.	do	1905	21	Apr. 8	Apr. 16	Apr. 7	Apr. 23	Aug. 1	Sept. 25	Oct. 14	Nov. 1	Jan.	
2	do	35	30	2,900	E.	Clay loam	1904	8	Apr. 17	Apr. 28	Apr. 20	Apr. 7			do			
2	do	35	30	2,900	E.	do	1905	9	Apr. 5	Apr. 13	Apr. 18	Apr. 3	July 24	Nov. 12	Oct. 17			
10	do	35	30	2,875	SW.	do	1902	14	Apr. 29	May 8	Apr. 1	May 6	July 28	Oct. 15	Oct. 15	Dec. 15	Mar.	
10	do	35	30	2,875	SW.	do	1903	7	Apr. 1	Apr. 12	Apr. 28	Apr. 5	July 15	Oct. 20	Oct. 25	Dec. 25	Apr.	
10	do	35	30	2,875	SW.	do	1904	8	Apr. 16	Apr. 25	Apr. 1	Mar. 23	June 30	Oct. 15	Oct. 16	Nov. 1	Feb.	
10	do	35	30	2,875	SW.	do	1905	9			Mar. 10	Mar. 28	July 2	Oct. 20		Dec. 15	Do.	
10*a*	do	35	30	3,300	NE.	Porous loam	1902	6	Apr. 21	Apr. 27	Apr. 15	Apr. 24	July 30	do	Oct. 5	Dec. 20	Mar.	
10*b*	do	35	30	3,500	SE.	do	1902	12	May 1	May 10	Apr. 20	May 7	July 29	do	Oct. 3	do	Do.	
10*c*	do	35	30	4,000	NE.	Clayey loam	1902	9	do	May 8	Apr. 25	May 9	July 30	do	do	Feb. –	Do.	
10*d*	do	35	30	4,500	SE.	Sandy loam	1902	12	Apr. 25	May 3	Apr. 22		do	Oct. 25	Oct. 1	Dec. 20	Feb.	
10*d*	do	35	30	4,500	SE.	do	1903	13	May 1	May 12	Apr. 28	May 4	July 18	Oct. 10	Oct. 5	Dec. 10	May.	
1	do	35	35	2,300	S.	Loam	1904	4	Apr. 15	Apr. 28	Apr. 20	Apr. 3			Oct. 15			
17	do	36	15	3,000	SE.	Clay loam	1904	8	Apr. 30	May 8	May 3	May 5		Oct. 7	Oct. 11	Jan. 15	May.	
47	Virginia	36	45	1,700	SE.	Black loam	1905		Apr. 15	May 1	May 1			Sept. 20		Oct. 20	Apr.	
33	do	37	0	5	None.	Sandy loam	1904	8	Apr. 21	Apr. 30	Apr. 20	Apr. 5	June 23	Aug. 20	Oct. 17			
49	do	37	5				1907	11	Apr. 23	May 3	do	Apr. 28		Oct. 5	Oct. 15	Sept. 15	May.	
39	do	37	10	2,000	NW.	Dark loam	1902	10	Apr. 26	May 1	May 18	Apr. 20		Oct. 10	Sept. 10	Dec. 25	Mar.	
40	do	37	10	2,400	SE.	Porous loam	1907	8	Apr. 15	Apr. 30		Apr. 5						
26	do	37	15	900	N.	Sandy loam	1902	15	Apr. 19	Apr. 25								
26	do	37	15	900	N.	do	1903	16	Apr. 4	Apr. 11				Sept. 10		Sept. 15	Nov.	
38	do	37	15	2 170	NW.	Limestone clay	1902	13	Apr. 26	May 3	Apr. 18	Apr. 12		Sept. 25	Sept. 14			
38	do	37	15	2,170	NW.	do	1903	14	Apr. 25	Apr. 30	Apr. 5	Mar. 30		Sept. 30	do			
38	do	37	15	2,170	NW.	do	1904	15	May 7	May 10	May 16	Apr. 23	June 22		Oct. 15			
28	do	37	20	1,000	N.	Sandy loam	1904	8	May 15		May 7			Oct. 20		Oct. 20	Late.	

a From cold storage.

TABLE IV.—*Phenological records—Apples*—Continued.

BEN DAVIS—Continued.

Observer's number.	State.	Approximate latitude.	Elevation (feet).	Slope.	Soil.	Year.	Age of tree (yrs.).	Date first bloom.	Date full bloom.	Date last spring frost.	Date leaf buds begin to open.	Date terminal buds begin to form.	Date picked (first picking.)	Date first fall frost.	Date fit for use.	Keeps until—
		° ′														
28	Virginia	37 20	1,000	N.	Sandy loam	1905	9	Apr. 12	Apr. 20	Mar. 28	Apr. 3	June 15	Sept. 24		Oct. 5	Late.
28	do	37 20	1,000	N.	do	1906	10	Apr. 17	Apr. 23	May 29	Apr. 2	July 10		Nov. 20		
25	do	37 20	1,000	SE.	Cecil clay	1902	10	Apr. 15	Apr. 20	May 20	Apr. 15	July 15	Oct. 15	Oct. 20	Jan. –	Mar.
25	do	37 20	1,000	SE.	do	1903	11	Apr. 20	May 1	Apr. 20	Apr. 20	July 20	Oct. 10	Oct. 15	Dec. –	Do.
25	do	37 20	1,000	SE.	do	1904	12	May 1	May 10	May 5	May 1	July 10	do	Oct. 10	do	Do.
25	do	37 20	1,000	SE.	do	1905	13	Apr. 25	May 5	Apr. 15	Apr. 25	July 20	Oct. 20	Oct. 20	do	Do.
29	do	37 20	1,000	SE	do	1903	4	Apr. 4	Apr. 25	Apr. 6	Apr. 15		Sept. 15		Sept. –	Jan.
31	do	37 25	1,400	NW.	Porous loam	1902	6	Apr. 21	Apr. 24	Apr. 8	Apr. 21	July –	Sept. 25		Nov. 4	Late.
27	do	37 30	1,000	NE.	Clay loam	1902	26	Apr. 19	Apr. 22	Mar. –	Apr. 9		Sept. 20	Nov. –	Oct. –	Dec.
27	do	37 30	1,000	NE.	do	1904	38	Apr. 18	do	Apr. 22			Sept. 15	Oct. 26	Sept. –	Nov.
44	do	37 45	625	SW.	Loam	1904	12	Apr. 22	Apr. 26	Apr. *a*	Apr. 4	June 15				
50	do	37 55	200	E.&W.	Sandy loam	1902	15	Apr. 17	Apr. 23	Apr. 9	Apr. 10		Oct. –	Oct. 30	Oct. –	Dec.
50	do	37 55	200	E.&W.	do	1903	16	Mar. 29	Apr. 3		Apr. 5		do		do	
50	do	37 55	200	E.&W	do	1904	17	Apr. 20	Apr. 25	Apr. 6	Apr. 25		Oct. 20	Sept. 7	do	
50	do	37 55	200	E.&W.	do	1905	18	Apr. 12	Apr. 16	Apr. 19	Apr. 16		Oct. 1	Oct. 22	do	Oct.
50	do	37 55	200	E.&W.	do	1906	19	Apr. 15	Apr. 25	May 11	Apr. 25		Oct. 20		Nov. –	Dec.
71	Maryland	38 5	20	SE.	Clay loam	1902	8		Apr. 29		Apr. 12		do		Nov. –	Do.
19	Virginia	38 5	900	S.	Cecil clay	1905	14	Apr. 14	Apr. 22	Apr. 19	Apr. 1		Sept. 1	Oct. 7		
23	do	38 10	1,400	N.	Porous loam	1907	8	Apr. 23	May 1	May 18	do	July 10	Oct. 8	Oct. 13	Dec. –	May.
22	do	38 10	1,200	NE.	do	1907	20	do	Apr. 30	May 22	Mar. 28		Oct. 15	Oct. 9	Feb. 1	Apr.
36	do	38 15	650		Sandy loam	1902	15	Apr. 19	Apr. 24	May 3	Apr. 18		Oct. 17			
53	do	38 25	1,400	W.	Porous loam	1902	16	Apr. 28	May 2		Apr. 17		Sept. 30		Nov. –	Feb.
53	do	38 25	1,400	W.	do	1903	17	Apr. 9	Apr. 20		Apr. 9		Oct. –		Dec. –	Do.
53	do	38 25	1,400	W.	do	1905	19	Apr. 22	Apr. 27	Apr. 24	Apr. 4		Oct. 1	Oct. –	Oct. –	Do.
53	do	38 25	1,400	W.	do	1906	20	Apr. 27	May 3	May 11	Apr. 18	July –	do	Oct. 8	do	Do.
35	do	38 30	400	NE.	Clayey	1902	15	Apr. 22	Apr. 26	Apr. 15	Apr. 9	Aug. 18	Sept. 26	Oct. 22		Mar.
35	do	38 30	400	NE.	do	1903	16	Apr. 2	Apr. 12	Apr. 5	Mar. 21	Aug. 6	Oct. 1	Oct. 18		Do.
35	do	38 30	400	NE.	do	1904	17	Apr. 30	May 5	Apr. 23	Apr. 8	July 23	Sept. 26	Sept. 23		Do.
35	do	38 30	400	NE.	do	1905	18	Apr. 18	Apr. 20	Apr. 20	Apr. 30	July 18		Oct. 13		Do.
35	do	38 30	400	NE.	do	1906	19	Apr. 22	Apr. 28	May 10	Apr. 9	July 28		Oct. 12	Sept. 1	Do.
61	Maryland	38 40	45	None.	Sandy loam	1907	15	Apr. 15	do							
78	Delaware	38 45	50	SE.	do	1904	21	Apr. 29	May 4	Apr. 22	Apr. 13					
34	Virginia	38 45	300	W.	Clay loam	1902	13	Apr. 18		May 30*b*						
48	do	38 45	375	SE.	Porous loam	1903	15	Apr. 8	Apr. 11	Apr. 5	Apr. 15	July 2	Sept. 15	Oct. 25	Jan. –	Mar.
48	do	38 45	375	SE.	do	1905	17	Apr. 23	Apr. 26	Apr. 19	Apr. 21					
48	do	38 45	375	SE.	do	1906	30	Apr. 26	Apr. 28	May 11	Apr. 29			Oct. 11	Sept. 20	Feb.
48	do	38 45	375	SE.	do	1907		Apr. 22	Apr. 25	Apr. 20				Oct. 13		

56	.....do.....	38	50	950	NW.	Clay loam.....	1907	10	Apr. 20	Apr. 30	Apr. 10	Apr. 20	.....	Sept. –	.....	Jan. –	Apr.
54	.....do.....	39	0	1,000	NE.	Porous loam.....	1902	14	Apr. 23	Apr. 26	Apr. 14	Apr. 14	June 15	Oct. 1	.....	Nov. –	Late.
54	.....do.....	39	0	1,000	NE.	.....do.....	1903	15	Apr. 6	Apr. 20	Apr. 15	Mar. 27	June 10	...do....	.....	Dec. –	June.
54	.....do.....	39	0	1,000	NE.	.....do.....	1904	16	May 2	May 7	Apr. 20	Apr. 21	...do....	.....	.....	.....	.....
54	.....do.....	39	0	1,000	NE.	.....do.....	1905	17	Apr. 17	Apr. 24	Apr. 19	Apr. 3	...do....	Sept. 20	.....	Dec. –	.....
54	.....do.....	39	0	1,000	NE.	.....do.....	1906	18	Apr. 24	Apr. 29	May 8	Apr. 17	...do....	Oct. 1	.....	Oct. –	Apr.
54	.....do.....	39	0	1,000	NE.	.....do.....	1907	19	Apr. 20	Apr. 25	Apr. 23	Mar. 29	June 15	...do....	.....	Dec. –	June.
55	.....do.....	39	0	600	E.	.....do.....	1907	14	Apr. 21	Apr. 24	May 9	Mar. 27	.....	...do....	Oct. 10	Mar. –	May.
57	Maryland.....	39	0	75	None.	Sandy.....	1907	15	Apr. 27	May 6	Apr. 18	Apr. 6	.....	.....	.....	.....	.....
68	.....do.....	39	10	550	S.	Clay loam.....	1906	9	Apr. 21	May 2	May 10	Apr. 17	.....	Oct. 1	Oct. 12	.....	.....
32	Virginia.....	39	10	500	NW.	Red loam.....	1905	11	Apr. 23	Apr. 26	Apr. 18	Apr. 1	Apr. 18	Oct. 4	.....	Dec. –	Mar.
32	.....do.....	39	10	500	NW.	.....do.....	1906	12	Apr. 26	Apr. 30	Apr. 25	Apr. 20	June 15	Oct. 1	Oct. 15	Jan. –	Do.
37	.....do.....	39	10	600	NW.	Clay loam.....	1903	17	Apr. 17	Apr. 23	.....	.....	.....	.....	.....	.....	.....
87	New Jersey.....	39	15	40	SW.	Sandy loam.....	1902	10	Apr. 30	May 7	.....	Apr. 24	.....	.....	.....	.....	.....
65	Maryland.....	37	20	75	None.	Gravelly loam.....	1902	7	Apr. 25	Apr. 28	.....	Apr. 7	.....	Oct. 15	Nov. –	Dec. –	.....
65	.....do.....	37	20	75	None.	.....do.....	1903	8	Apr. 15	Apr. 20	.....	Apr. 1	.....	.....	.....	Nov. –	Jan.
64	.....do.....	39	25	225	SE.	Stony loam.....	1905	15	Apr. 25	Apr. 30	Apr. 19	Apr. 23	.....	Oct. 15	Oct. 19	...do.....	Do.
64	.....do.....	39	25	225	SE.	.....do.....	1906	16	Apr. 29	May 1	May 10	May 1	.....	.....	Oct. 11	.....	.....
64	.....do.....	39	25	225	SE.	.....do.....	1907	17	May 1	May 10	May 5	Apr. 28	.....	.....	Oct. 17	.....	.....
63	.....do.....	39	30	150	N.	Clay loam.....	1907	20	...do.....	May 6	May 12	Apr. 24	Aug. 6	Oct. 14	Oct. 14	Sept. 16	Mar.
62	.....do.....	39	35	500	E.	Loam.....	1905	25	Apr. 26	May 4	May 5	Apr. 28	.....	.....	Oct. 17	.....	.....
89	New Jersey.....	39	40	150	None.	Porous loam.....	1904	25	May 8	May 12	Apr. 17	May 4	June 15	Oct. 1	Sept. 25	.....	Apr.[c]
90	.....do.....	39	45	125	SW.	Gravelly.....	1907	10	May 5	May 9	Apr. 21	.....	.....	.....	.....	.....	.....
91	.....do.....	39	50	.....	.....	.....	1906	3	Apr. 30	May 1	.....	Apr. 14	July 20	Oct. 15	.....	Oct. –	Apr.
82	.....do.....	39	55	50	W.	Sandy loam.....	1902	6	Apr. 25	Apr. 30	.....	.....	.....	Oct. 1	.....	Sept. –	Dec.
84	.....do.....	39	55	50	W.	Heavy loam.....	1902	20	...do.....	...do.....	Apr. 16	Apr. 20	Sept. 15	...do.....	Oct. 10	Dec. –	Feb.
84	.....do.....	39	55	50	W.	.....do.....	1903	21	Apr. 22	Apr. 28	May 2	Apr. 10	Aug. 30	...do.....	Oct. –	Oct. –	Do.
84	.....do.....	39	55	50	W.	.....do.....	1904	22	May 7	May 17	.....	Apr. 23	Aug. 1	...do.....	.....	Nov. –	Mar.
92	.....do.....	40	15	200	S.	Clay loam.....	1906	35	Apr. 23	Apr. 30	May 10	.....	.....	Oct. 15	Oct. –	Oct. –	Feb.
92	.....do.....	40	15	200	S.	.....do.....	1907	36	May 11	May 16	May 22	Apr. 27	June 12	Oct. 1	...do.....	Nov. –	Mar.
96	.....do.....	40	15	90	N.&S.	.....do.....	1904	21	May 9	May 14	.....	May 6	.....	Sept. 18	Sept. 17	Jan. –	Apr.
96	.....do.....	40	15	90	N.&S.	.....do.....	1905	22	May 2	May 9	Apr. –	Apr. 22	.....	Oct. 13	Oct. 18	...do.....	Do.
96	.....do.....	40	15	90	N.&S.	.....do.....	1906	23	...do.....	May 3	Apr. 18	Apr. 24	.....	Oct. 18	...do.....	Dec. –	Do.
94	.....do.....	40	20	125	S.	Sandy loam.....	1904	.....	May 6	May 11	.....	Apr. 29	July 16	Oct. 1	Sept. 20	...do.....	Mar.
94	.....do.....	40	20	125	S.	.....do.....	1906	.....	May 3	May 8	.....	Apr. 20	June 5	Oct. 20	.....	Oct. –	.....
94	.....do.....	40	20	125	S.	.....do.....	1907	.....	May 12	May 15	.....	Apr. 26	July 4	.....	.....	.....	.....
98	.....do.....	40	30	600	S.	Red shale.....	1905	14	May 3	May 12	Apr. 16	Apr. 28	.....	Sept. –	Sept. –	.....	Mar.
88	.....do.....	40	50	500	E.	Sandy loam.....	1907	16	May 8	...do.....	Apr. 25	May 14	.....	Oct. 15	Sept. 10	Nov. –	Do.
104	.....do.....	41	0	600	None.	Clay loam.....	1904	12	May 10	May 14	Apr. 23	May 2	July 6	Oct. 20	Sept. 22	.....	.....
104	.....do.....	41	0	600	None.	.....do.....	1905	13	May 7	May 11	Apr. 24	Apr. 26	July 3	Oct. 12	Oct. 22	Feb. –	May.
104	.....do.....	41	0	600	None.	.....do.....	1906	14	May 9	May 14	May 11	...do....	June 30	Oct. 13	Oct. 12	Mar. –	Do.
104	.....do.....	41	0	600	None.	.....do.....	1907	15	May 16	May 21	May 12	Apr. 27	July 1	Oct. 26	Oct. 25	...do.....	Do.
101	.....do.....	41	10	550	SE.	Gravelly.....	1904	11	May 7	May 18	Apr. 23	Apr. 28	.....	.....	Sept. 22	.....	.....

[a] Frost did much damage to the fruit.

[b] Frost seriously injured the fruit.

[c] From cold storage.

TABLE IV.—*Phenological records—Apples*—Continued.

Observer's number.	State.	Approximate latitude.	Elevation (feet).	Slope.	Soil.	Year.	Age of tree (yrs.).	Date first bloom.	Date full bloom.	Date last spring frost.	Date leaf buds begin to open.	Date terminal buds begin to form.	Date picked (first picking).	Date first fall frost.	Date fit for use.	Keeps until—
		° ′														
BONUM.																
6	North Carolina	35 5	200	None.	Sandy	1902	.....	Apr. 7	Apr. 17	.....	Mar. 30	.....	.....	Sept. 14	.....	.....
16	do	35 25	770	N.	do	1905	8	Apr. 2	Apr. 9	Apr. 18	Mar. 20	May 16	.....	Oct. 22	.....	.....
38	Virginia	37 15	2,170	NW.	Limestone clay	1902	13	Apr. 28	May 3	Apr. 8	Apr. 15	.....	.....	Sept. 14	.....	.....
31	do	37 25	1,400	NW.	Gravelly loam	1902	12	Apr. 20	Apr. 24	do	Apr. 21	July –	Aug. 15	.....	Aug. 15	Oct.
48	do	38 45	375	SE.	Porous loam	1903	10	Apr. 8	Apr. 12	Apr. 5	Apr. 15	.....	Sept. 1	Oct. 25	.....	Dec.
BOUGH.																
72	Delaware	39 10	70	None.	Sandy loam	1902	30	Apr. 23	Apr. 27	.....	.....	.....	July 5	Oct. 20	July 5	.....
96	New Jersey	40 15	90	N.&S.	Clay loam	1904	25	May 9	May 15	.....	May 7	.....	July 19	Sept. 17	July 25	.....
94	do	40 20	150	S.	Sandy loam	1902	38	Apr. 29	May 4	Apr. 28	Apr. 20	June 27	July 25	Oct. 10	July 20	.....
94	do	40 20	150	S.	do	1906	.....	Apr. 30	do	.....	Apr. 16	June 5	July 23	Oct. 14	Aug. 1	.....
CHENANGO.																
38	Virginia	37 15	2,170	NW.	Limestone clay	1903	12	Apr. 12	Apr. 21	Apr. 5	Mar. 27	.....	.....	Sept. 14	.....	.....
38	do	37 15	2,170	NW.	do	1904	13	May 2	May 8	May 16	Apr. 16	June 25	.....	Oct. 15	.....	.....
COLTON.																
38	Virginia	37 15	2,170	NW.	Limestone clay	1903	14	Apr. 10	Apr. 28	Apr. 5	Mar. 27	.....	.....	Sept. 14	.....	.....
38	do	37 15	2,170	NW.	do	1904	15	Apr. 30	May 11	May 16	Apr. 16	June 25	.....	Oct. 15	.....	.....
37	do	39 10	600	NW.	Clay loam	1903	17	Apr. 12	Apr. 17	.....	.....	.....	.....	.....	.....	.....

6	North Carolina	35	5	200	None.	Sandy	1904	.....	Mar. 22	Mar. 28	.....	.....	.....	.....	.....	.....	.....	
7	do	35	20	700	None.	Loam	1905	10	Mar. 25	Mar. 31	Apr. 17	Mar. 15	.....	.....	Oct. 11	.....	.....	
11	do	35	25	1,990	SE.	Porous loam	1904	15	Apr. 20	Apr. 28	Apr. 21	Apr. 25	.....	June 20	Oct. 24	.....	.....	
11	do	35	25	1,990	SE.	do	1905	10	do	May 1	May 6	May 6	.....	July 20	Oct. 18	July 1	Aug.	
11	do	35	25	1,990	SE.	do	1906	8	Apr. 15	Apr. 25	May 10	Apr. 8	.....	June 20	.....	June 20	.....	
11	do	35	25	1,990	SE.	do	1907	9	Mar. 30	Apr. 20	Apr. 20	Apr. 10	.....	.....	Oct. 13	.....	.....	
12	do	35	25	2,100	W.	do	1902	12	Apr. 18	Apr. 24	Apr. 5	Apr. 16	July 1	July 10	Oct. 15	July 1	Aug.	
12	do	35	25	2,100	W.	do	1903	18	Mar. 28	Apr. 6	Apr. 6	Apr. 8	.....	.....	.....	.....	.....	
12	do	35	25	2,100	W.	do	1904	19	Apr. 12	Apr. 20	Apr. 11	Apr. 21	July 26	July 18	Oct. 15	July 20	Aug.	
12	do	35	25	2,100	W.	do	1905	20	Apr. 2	Apr. 10	Apr. 7	Apr. 12	July 15	July 14	Oct. 14	July 15	Do.	
13	do	35	25	2,180	NE.	Clay loam	1905	16	Mar. 28	Apr. 20	Mar. 27	Mar. 25	.....	.....	Oct. 17	July 1	.....	
13	do	35	25	2,180	NE.	do	1907	17	Apr. 3	.....	Apr. 15[a]	.....	.....	.....	Oct. 15	.....	.....	
2	do	35	30	2,900	E.	do	1904	.....	Apr. 18	Apr. 28	Apr. 20	.....	.....	.....	Oct. 14	.....	.....	
2	do	35	30	2,900	E.	do	1905	.....	Apr. 2	Apr. 12	Apr. 18	Apr. 21	July 20	July 1	Oct. 17	.....	.....	
10	do	35	30	2,875	SW.	do	1902	.....	Apr. 28	May 5	Apr. 1	May 4	July 30	July 25	Oct. 15	Aug. 1	Aug.	
10[d]	do	35	30	4,500	SE.	Sandy loam	1903	12	May 1	May 10	Apr. 28	May 10	July 15	Aug. 15	do	Aug. 20	.....	
1	do	35	30	2,300	S.	Porous loam	1902	10	Apr. 20	Apr. 26	Apr. 18	Apr. 12	.....	.....	do	.....	Aug.	
1	do	35	30	2,300	S.	do	1904	12	Apr. 12	Apr. 28	Apr. 20	Apr. 3	July 1	.....	do	.....	.....	
1	do	35	30	2,300	S.	do	1905	13	Apr. 5	Apr. 15	Apr. 16	Mar. 27	.....	.....	Oct. 16	.....	.....	
1	do	35	30	2,300	S.	do	1906	10	Apr. 20	Apr. 26	Apr. 18	Apr. 12	.....	.....	Oct. 15	.....	.....	
15[a]	do	35	45	6	None.	Sandy	1907	.....	Apr. 4	Apr. 22	Mar. 15	Apr. 5	Apr. 19	.....	Oct. 20	.....	.....	
4	do	35	50	1,200	S.	Sandy loam	1904	12	Apr. 15	.....	.....	.....	.....	.....	.....	July 1	Aug.	
4	do	35	50	1,200	S.	do	1905	13	do	May 1	Apr. 24	.....	.....	.....	.....	.....	July.	
16	do	36	10	3,250	S.	Clay loam	1904	18	May 8	May 15	Apr. 21	Apr. 26	July 5	.....	Oct. 15	Aug. 10	Sept.	
16	do	36	10	3,250	S.	do	1905	19	Apr. 23	May 1	May 16	Apr. 12	July 9	Aug. 10	Oct. 20	.....	.....	
17	do	36	15	3,000	SE.	do	1904	12	Apr. 28	May 5	May 3	May 1	.....	do	Oct. 11	July 25	Sept.	
47	Virginia	36	45	1,700	SE.	Black loam	1905	15	Apr. 10	Apr. 20	May 1	.....	.....	Aug. 1	.....	Aug. 1	Do.	
33	do	37	0	5	SW.	Sandy loam	1903	7	.....	.....	Apr. 5	Mar. 23	.....	July 1	Oct. 27	July 1	July.	
33	do	37	0	5	SW.	do	1904	8	Apr. 13	Apr. 26	Apr. 20	Mar. 28	June 23	July 3	Oct. 17	July 8	Do.	
40	do	37	10	2,400	None.	Clay loam	1907	8	Apr. 7	Apr. 18	Apr. 1	.....	.....	.....	.....	.....	.....	
39	do	37	10	2,000	NW.	Loam	1902	4	Apr. 24	Apr. 28	May 18	Apr. 20	.....	.....	Sept. 10	July 25	Aug.	
26	do	37	15	900	N.	Clay loam	1903	.....	Apr. 1	Apr. 7	.....	.....	June 15	July 15	.....	June 20	July.	
46	do	37	15	500	S.	Sandy loam	1903	.....	Mar. 30	.....	.....	.....	.....	.....	.....	do	Do.	
38	do	37	15	2,170	NW.	Limestone clay	1903	13	Apr. 28	May 2	Apr. 18	Apr. 11	.....	.....	Sept. 14	.....	.....	
38	do	37	15	2,170	NW.	do	1904	14	Apr. 12	Apr. 29	Apr. 5	Mar. 26	.....	.....	do	.....	.....	
38	do	37	15	2,170	NW.	do	1905	15	.....	.....	May 16	Apr. 18	June 20	.....	Oct. 15	.....	.....	
30	do	37	20	950	SE.	Clay loam	1902	27	Apr. 12	Apr. 25	Apr. 1	Apr. 15	.....	July 10	Oct. 27	July 1	.....	
30	do	37	20	950	SE.	do	1903	28	Apr. 2	Apr. 10	Apr. 6	Mar. 28	.....	June 28	Nov. 2	July 10	.....	
28	do	37	20	1,000	N.	do	1904	6	May 5	May 10	May 7	Apr. 14	.....	June 20	.....	June 20	July.	
28	do	37	20	1,000	N.	do	1906	8	Apr. 10	Apr. 16	Mar. 29	Apr. 2	June 19	.....	Nov. 20	.....	.....	
28	do	37	20	1,000	N.	do	1907	9	Apr. 13	Apr. 23	Mar. 7	Mar. 20	June 25	.....	Nov. 4	July 16	Aug.	
52	do	37	20	1,200	W.	.....	1902	16	Apr. 16	Apr. 22	.....	Apr. 7	.....	.....	.....	.....	.....	
29	do	37	20	1,000	.....	Clay loam	1903	25	Mar. 25	Apr. 6	Apr. 6	Apr. 10	.....	June 24	.....	June 10	July.	
31	do	37	25	1,400	NW.	do	1902	12	Apr. 19	Apr. 23	Apr. 8	Apr. 20	July –	June 15	.....	June 15	Do.	
44	do	37	45	625	SW.	Loam	1904	12	Apr. 24	.....	Apr. –	Apr. 4	June 15	.....	.....	.....	.....	
45	do	37	50	.....	S.	do	1906	56	Apr. 12	Apr. 16	May 9	Apr. 5	.....	.....	Oct. 10	.....	.....	
50	do	37	55	200	E.&W.	Sandy loam	1902	15	Apr. 17	Apr. 23	Apr. 9	May 10	.....	July –	Oct. 30	July –	Aug.	

[a] Frost killed the entire crop.

TABLE IV.—*Phenological records—Apples*—Continued.

EARLY HARVEST—Continued.

Observer's number.	State.	Approximate latitude.	Elevation (feet).	Slope.	Soil.	Year.	Age of tree (yrs.).	Date first bloom.	Date full bloom.	Date last spring frost.	Date leaf buds begin to open.	Date terminal buds begin to form.	Date picked (first picking).	Date first fall frost.	Date fit for use.	Keeps until—
		° ′														
50	Virginia	37 55	200	E.&W.	Sandy loam	1903	16	Mar. 28	Apr. 2		Apr. 5		July –		July 5	Aug.
50	do	37 55	200	E.&W.	do	1904	17	Apr. 20	Apr. 25	Apr. 6	Apr. 25		July 10	Sept. 7		
50	do	37 55	200	E.&W.	do	1905	18	Apr. 10	Apr. 14	Apr. 19	Apr. 14		July 5	Oct. 22	July 5	Aug.
50	do	37 55	200	E.&W.	do	1906	19	Apr. 15	Apr. 25	May 11	Apr. 25		July 10			Do.
50	do	37 55	200	E.&W.	do	1907	20			May –[a]						
20	do	38 0	700	S.	Clay loam	1905	30	Apr. 10	Apr. 14	Apr. 18	Mar. 29					
36	do	38 15	650		Sandy loam	1902	11	Apr. 18	Apr. 20	May 3	Apr. 18			Oct. 17		
35	do	38 30	400	NE.	Red clay	1902	2	Apr. 20	Apr. 24	Apr. 15	Mar. 29	Aug. 25		Oct. 22		
35	do	38 30	400	NE.	do	1903	3	Mar. 30	Apr. 5	Apr. 5	Mar. 20	Aug. 3	July 9	Oct. 18		July.
35	do	38 30	400	NE.	do	1904	4	Apr. 26	May 4	Apr. 23	Apr. 3	July 3		Sept. 23		
35	do	38 30	400	NE.	do	1905	5	Apr. 10	Apr. 18	Apr. 20	Mar. 31	July 11	July 8	Sept. 13		July.
35	do	38 30	400	NE.	do	1906	6	Apr. 19	Apr. 23	May 10	Apr. 8	July 14		Oct. 12		
78	Delaware	38 45	50	SE.	Sandy loam	1904	21	Apr. 25	May 4	Apr. 22	Apr. 3					
34	Virginia	38 45	300	W.	Clay loam	1902	13	Apr. 15		May 30[b]				Sept. 18		
48	do	38 45	375	SE.	Sandy loam	1903	15	Apr. 8	Apr. 11	Apr. 5	Apr. 15	June 28	July 10	Oct. 25		July.
48	do	38 45	375	SE.	do	1905	20	Apr. 21	Apr. 24	Apr. 19[b]	Apr. 21					
56	do	38 50	950	NW.	Clay loam	1907	4	Apr. 10	Apr. 20	Apr. 10	Apr. 15		July 1		July 1	
54	do	39 0	1,000	NE.	Sandy loam	1902	18	Apr. 23	Apr. 28	Apr. 14	Apr. 14	June 15	do		do	July.
54	do	39 0	1,000	NE.	do	1903	19	Apr. 9	Apr. 20	Apr. 5	Mar. 27	June 10	July 4		July 10	Do.
54	do	39 0	1,000	NE.	do	1904	20	May 1	May 6	Apr. 20	Apr. 19	do				
54	do	39 0	1,000	NE.	do	1905	21	Apr. 13	Apr. 22	Apr. 19	Apr. 4	do				
54	do	39 0	1,000	NE.	do	1906	22	Apr. 20	Apr. 27	May 8	Apr. 16	do	July 1		July 1	Aug.
54	do	39 0	1,000	NE.	do	1907	23	Apr. 16	Apr. 24	Apr. 23	Mar. 29	do	do		do	Do.
75	Delaware	39 0	60	None.	do	1906	20	Apr. 21	Apr. 27	Apr. 3	Apr. 18			Oct. 12		
72	do	39 10	70	None.	do	1902	25	Apr. 24	do				July 1	Oct. 20	July 1	
74	do	39 10	80	None.	Clay loam	1903	8	Apr. 16	Apr. 24	Apr. 6			July 10	Oct. 22	July 10	
67	Maryland	39 20	50	E.	Sandy loam	1903	30	Apr. 9	Apr. 13	do	Apr. 6		July 1	Oct. 26	July 15	
65	do	39 20	75		do	1902	7	Apr. 23	Apr. 27		Apr. 8		July 15	Nov. –	do	
65	do	39 20	75		do	1903	8	Apr. 9	Apr. 20		Mar. 26					
63	do	39 30	150	N.	Clay loam	1907	20	Apr. 29	May 6	May 12	Apr. 19	July 28	July 15	Oct. 15	July 10	July.
60	do	39 35	75	SW.	Heavy loam	1902	25	do	May 2	May 28	Apr. 25	July 5	July 8	Nov. 15	July 8	Do.
60	do	39 35	75	SW.	do	1903	26	Apr. 16	Apr. 23	Apr. 20	Apr. 4			Nov. –		
60	do	39 35	75	SW.	do	1904	27	May 7	May 10	May 11	Apr. 30	June 29	July 25	Sept. 17		July.
60[a]	do	39 35	125	SW.	Sandy loam	1902	29	Apr. 28	May 1	Apr. 20	Apr. 22		July 15	Nov. 15	July 10	Do.
60[a]	do	39 35	125	SW.	do	1903	30	Apr. 16	Apr. 23	do	Apr. 4	July 4		Nov. –		
60[a]	do	39 35	125	SW.	do	1904	31	May 2	May 8	Apr. 21	Apr. 26	June 25	July 25	Sept. 17		Aug.
79	New Jersey	39 35	90	NW.	Gravelly loam	1902	50	Apr. 21	Apr. 27	Apr. 15	Apr. 19		July 6	Oct. 22	July 6	July.
59	Maryland	39 40	300	None.	do	1902	15	Apr. 26	Apr. 28	do	Apr. 15	July 1	July 10		July 4	Do.
82	New Jersey	39 55	50	W.	Sandy loam	1902	20	Apr. 21	Apr. 27				July 11		July 11	Do.
84	do	39 55	50	N.	do	1902	35	Apr. 25	Apr. 30	Apr. 16	Apr. 20	Aug. 1	July 10	Oct. 10	July 20	

84	do	39	55	50	N.	do	1903	36	Apr. 18	Apr. 25	May 2	Apr. 1	July 25	July 15	Oct. –	July 15	
84	do	39	55	50	N.	do	1904	37	May 3	May 8		Apr. 25	do	July 1		July 1	
80	do	40	5	50	N.	Gravelly loam	1904	40	May 5	do	Apr. 24		June 1	July 20	Oct. 10	July 4	
97	do	40	5	60	SW.	Sandy loam	1905	35	Apr. 14							July 20	
94	do	40	20	150	S.	do	1902	38	Apr. 23	Apr. 27	Apr. 28	Apr. 20	June 27	July 8		July 8	July.
94	do	40	20	150	S.	do	1905	41	Apr. 29	May 4	Apr. 19	Apr. 10		July 10	Oct. –	July 10	Do.
94	do	40	20	150	S.	do	1906	42	Apr. 30	May 5		Apr. 18	June 5	do	Oct. 14	do	Do.
94	do	40	20	150	S.	do	1907	43	May 10	May 13		Apr. 24	July 5	July 15	Oct. 20	July 20	Do.
98	do	40	30	600	S.	Red shale	1905	14	May 1	May 6					Oct. –		
88	do	40	50	500	E.	Sandy loam	1907	18	May 8	May 12	Apr. 25	Apr. 14		July 25	Oct. 10	July 25	July.
101	do	41	10	550	SE.	Gravelly	1904	15	May 6	May 17	Apr. 23	Apr. 28			Sept. 22		
103	do	41	15	400	SW.	Sandy loam	1904		May 10	May 15	May 5				Sept. 28		

EARLY RIPE.

6	North Carolina	35	5	200	None.	Sandy	1904		Mar. 18	Mar. 24							
3	do	35	25	770	N.	do	1905	8	Apr. 2	Apr. 9	Apr. 18	Mar. 20	May 22	June 10	Oct. 22	June 10	
13	do	35	25	2,180	NE.	Porous clay	1904	15	Apr. 22	May 10	Apr. 17	Apr. 25	May 30	June 25	Oct. 15	June 25	
38	Virginia	37	15	2,170	NW.	Limestone clay	1902	13	Apr. 20	Apr. 29	Apr. 18	Apr. 5			Sept. 14		
38	do	37	15	2,170	NW.	do	1903	14	Apr. 8	Apr. 20	Apr. 5	Mar. 25			do		
38	do	37	15	2,170	NW.	do	1904	15	May 1	May 7	May 16	Apr. 19	June 20		Oct. 15		
35	do	38	30	400	NE.	Red clay	1902	15	Apr. 21	Apr. 25	Apr. 15	Mar. 29	Aug. 25	July 9	Sept. 22	June 29	July.
35	do	38	30	400	NE.	do	1903	16	Mar. 30	Apr. 5	Apr. 5	Mar. 20	Aug. 3	July 7	Sept. 18	June 15	Do.
35	do	38	30	400	NE.	do	1904	17	Apr. 24	May 1	Apr. 23	Apr. 2	July 15	July 25	Sept. 23	June 28	Do.
35	do	38	30	400	NE.	do	1905	18	Apr. 11	Apr. 17	Apr. 20	Mar. 31	July 12	July 12	Oct. 13	June 19	Do.
35	do	38	30	400	NE.	do	1906	19	Apr. 18	Apr. 22	May 10	Apr. 8	July 18	July 14	Oct. 12	July 4	Do.
76	Delaware	39	5	40	NE.	Sandy	1903	10	Apr. 4	Apr. 8	Apr. 6	Mar. 28	June 1	June 18			
76	do	39	5	40	NE.	do	1904	11	Apr. 27	Apr. 30	Apr. 21	Apr. 20	do	July 1	Oct. 28		
76	do	39	5	40	NE.	do	1905	12	Apr. 18	Apr. 21	Apr. 19	Mar. 30	June 2	June 30	Oct. 22		
65	Maryland	39	20	75		Gravelly loam	1902	7	Apr. 23	Apr. 27		Apr. 1		July 5	Nov. –		
65	do	39	20	75		do	1903	8	Apr. 9	Apr. 20		do					
94	New Jersey	40	20	150	S.	Sandy loam	1903	30	Apr. 22	Apr. 27	May 5	Apr. 9	June 13	July 11	Oct. –		July.

FALL PIPPIN.

10c	North Carolina	35	30	4,000	NE.	Clay loam	1902	6	May 2	May 6	Apr. 25	May 8	July 26	Oct. 15	Oct. 3	Nov. 1	Dec.
33	Virginia	37	0	5	None.	Sandy loam	1904	8	Apr. 23	Apr. 28	Apr. 20	Apr. 3	June 23	Sept. 1	Oct. 17		
38	do	37	15	2,170	NW.	Limestone clay	1903	12	Apr. 15	do	Apr. 5	Apr. 28		Sept. 14			
38	do	37	15	2,170	NW.	do	1904	13	May 6	May 11	May 16	Apr. 22	June 29	Oct. 15			
72	Delaware	39	10	70	None.	Sandy loam	1902	10	Apr. 22	Apr. 25				Sept. 15	Oct. 20	Sept. 15	Dec.
87	New Jersey	39	15	40	SW.	do	1902	10	Apr. 30	May 7		Apr. 24					
93	do	40	15	200	SE.	do	1907	43	May 8	May 11	May 30	May 1		Sept. 6	Nov. –	Oct. –	Nov.
100	do	40	35	600	N.	Clay loam	1903	24	Apr. 24			Apr. 1					
100	do	40	35	600	N.	do	1904	25	May 10	May 16	Apr. 22	May 3					
103	do	41	15	400	SW.	Sandy loam	1904		May –	May 14	May 5				Sept. 28		

a Frost killed the entire crop.

b Frost seriously injured crop.

TABLE IV.—*Phenological records—Apples*—Continued.

FAMEUSE.

Observer's number.	State.	Approximate latitude.	Elevation (feet).	Slope.	Soil.	Year.	Age of tree (yrs.).	Date first bloom.	Date full bloom.	Date last spring frost.	Date leaf buds begin to open.	Date terminal buds begin to form.	Date picked (first picking).	Date first fall frost.	Date fit for use.	Keeps until—
		° ′														
38	Virginia	37 15	2,170	NW.	Limestone clay	1902	13	Apr. 25	May 2	Apr. 18	Apr. 11			Sept. 14		
38	do	37 15	2,170	NW.	do	1903	14	Apr. 15	Apr. 21	Apr. 15	Apr. 6		Sept. 20	do		
38	do	37 15	2,170	NW.	do	1904	15	May 6	May 10	May 16	Apr. 17	June 25		Oct. 15		
72	Delaware	39 10	70	None.	Sandy loam	1902	30	Apr. 25	Apr. 28				Aug. 15	Oct. 20		
60	Maryland	39 35	75	SW.	Heavy loam	1902	25	Apr. 30	May 2	May 28	Apr. 23	July 5		Nov. 15		
60	do	39 35	75	SW.	do	1903	26	Apr. 28	do	Apr. 20	Apr. 2			Nov. –		
60	do	39 35	75	SW.	do	1904	27	May 4	May 9	May 11	May 1	June 30	Oct. 5	Sept. 11		
94	New Jersey	40 20	150	S.	Sandy loam	1902	38			Apr. 28	Apr. 20		Sept. 20	Oct. 10	Sept. 20	Oct.
94	do	40 20	150	S.	do	1904	40	May 8	May 11		Apr. 30	July 16	Sept. 1	Sept. 20	Sept. 10	Do.
94	do	40 20	150	S.	do	1905	41	Apr. 30	May 5	Apr. 19			do	Oct. –	Sept. 1	Do.
94	do	40 20	150	S.	do	1906	42	May 3	May 9	May 11	Apr. 18	June 5		Oct. 14		
94	do	40 20	150	S.	do	1907	43	May 10	May 13		Apr. 26	July 3	Sept. 17	Oct. 20	Oct. 1	Oct.
103	do	41 15	400	SW.	do	1904			May 14	May 5				Sept. 28		

FANNY.

38	Virginia	37 15	2,170	NW.	Limestone clay	1903	14	Apr. 14	Apr. 26	Apr. 5	Apr. 5		Sept. 15	Sept. 14	Oct. –	
38	do	37 15	2,170	NW.	do	1904	15			May 16	Apr. 18	June 17		Oct. 15		
72	Delaware	39 10	70	None.	Sandy loam	1902	10	Apr. 23	Apr. 26				Aug. 1	Oct. 20		

GANO.

38	Virginia	37 15	2,170	NW.	Limestone clay	1902	13	Apr. 26	May 2	Apr. 18	Apr. 12		Sept. 25	Sept. 14		
38	do	37 15	2,170	NW.	do	1903	14	Apr. 12	Apr. 27	Apr. 5	Apr. 7		Oct. 1	do		Mar.
38	do	37 15	2,170	NW.	do	1904	15	May 7	May 12	May 16	Apr. 20	June 24		Oct. 15		
53	do	38 25	1,400	W.	Gravelly	1902	4	Apr. 25	May 1		Apr. 10		Oct. 1		Nov. –	Feb.
53	do	38 25	1,400	W.	do	1903	5	Apr. 12	Apr. 22		Apr. 9		Oct. –		do	Do.
53	do	38 25	1,400	W.	do	1905	7	Apr. 15	Apr. 25	Apr. 24	Apr. 6		do	Oct. –		Do.
53	do	38 25	1,400	W.	do	1906	8	Apr. 25	May 1	May 11	Apr. 15		Sept. –	Oct. 8	Sept. –	Jan.

GRAVENSTEIN.

33	Virginia	37	0	5	None.	Sandy loam	1904	8	Apr. 13	Apr. 26	Apr. 20	Apr. 1	June 26	Aug. 1	Oct. 17	Aug. 1	Aug.
38	do	37	15	2,170	NW.	Limestone clay	1903	14	do	Apr. 28	Apr. 5	Mar. 25			Sept. 14		
38	do	37	15	2,170	NW.	do	1904	15	May 2	May 8	May 16	Apr. 20	June 26		Oct. 15		
35	do	38	30	400	NE.	Red clay	1902	15	Apr. 25	Apr. 26	Apr. 15	Apr. 13	Aug. 27		Oct. 22		
35	do	38	30	400	NE.	do	1903	16			Apr. 5				Oct. 18		
35	do	38	30	400	NE.	do	1904	17	Apr. 29	May 4	Apr. 23	Apr. 10	July 14		Sept. 23		
35	do	38	30	400	NE.	do	1905	5			Apr. 20	Apr. 2	July 22		Oct. 13		
54	do	39	0	1,000	NE.	Porous loam	1902	8	Apr. 23	Apr. 26	Apr. 14	Apr. 15	June 10	Sept. 1		Sept. 15	Oct.
72	Delaware	39	10	70	None.	Sandy loam	1902	10	do	do				Aug. 1	Oct. 20	Aug. 5	Aug.
84	New Jersey	39	55	50	N.	Heavy loam	1902	25	Apr. 22	Apr. 29	Apr. 16	Apr. 10	Aug. 15	July 25	Oct. 10	Aug. 1	Do.
84	do	39	55	50	N.	do	1903	26	Apr. 18	Apr. 26	May 2	Apr. 1	Aug. 1	Aug. 25	Oct. –	July 25	Sept.
84	do	39	55	50	N.	do	1904	27	May 5	May 9		Apr. 25	July 25	Aug. 1		Aug. 10	Aug.
86	do	40	0	50	NW.	Loam	1904	20	May 3	May 5		do	July 10	do			
86	do	40	0	50	NW.	do	1905	21	May 1	May 6		May 8	July 1	do	Sept. 22	Aug. –	Sept.
80	do	40	5	50	N.	Gravelly loam	1904	35	May 4	May 7	Apr. 24		June 1	Aug. 25	Oct. 10	Aug. 10	Do.
80	do	40	5	50	N.	do	1905	50	Apr. 24	May 2	Apr. 19	Apr. 18	June 7	Sept. 1	Oct. 15	Aug. 20	Nov.
80	do	40	5	50	N.	do	1906	37	Apr. 23	Apr. 28	Apr. 6		do	Aug. 25		Aug. 5	Sept.
80	do	40	5	50	N.	do	1907	50	Apr. 28	May 6	Apr. 20	Apr. 6	June 20	do			
96	do	40	15	90	N. & S.	Clay loam	1904	25	May 7	May 12		May 4		Aug. 1	Sept. 17	Aug. 10	
96	do	40	15	90	N. & S.	do	1905	26	Apr. 29	May 4	Apr. –	Apr. 15		Aug. 15	Oct. 18	Aug. 15	
96	do	40	15	90	N. & S.	do	1906	27	Apr. 30	May 2	Apr. 18	Apr. 20		July 23	do	July –	Sept.
92	do	40	15	200	SE.	do	1906	35	Apr. 23	Apr. 29	May 10				Oct. –	Aug. –	
92	do	40	15	200	SE.	do	1907	36	May 5	May 11	May 22	Apr. 29	June 20	Sept. 1	do	Sept. –	
94	do	40	20	150	S.	Sandy loam	1903	37	Apr. 25	Apr. 30	May 5	Apr. 9	June 13	Aug. 18	do	Aug. –	Aug.
100	do	40	35	600	N.	Clay loam	1903	16	Apr. 26	Apr. 28							
100	do	40	35	600	N.	do	1904	17	May 8	May 14	Apr. 22	May 1					

GRIMES. Synonym: *Grimes Golden.*

12	North Carolina	35	25	2,128	W.	Porous loam	1902	20	Apr. 24	May 1	Apr. 5	Apr. 22	July 8	Sept. 20	Oct. 15	Oct. 1	Jan.
39	Virginia	37	10	2,000	NW.	Dark loam	1902	10	Apr. 26	do	May 18	Apr. 20		Oct. 10	Sept. 10		Dec.
38	do	37	15	2,170	NW.	Limestone clay	1902	13	Apr. 27	May 4	Apr. 18	Apr. 12		Sept. 15	Sept. 14		
38	do	37	15	2,170	NW.	do	1903	14	Apr. 13	Apr. 26	Apr. 5	Apr. 6			do	Sept. 20	Oct.
38	do	37	15	2,170	NW.	do	1904	15	May 7	May 12	May 16	Apr. 20	June 24		Oct. 15		
31	do	37	25	1,400	NW.	Gravelly loam	1902	12	Apr. 20	Apr. 23	Apr. 8	Apr. 21	July –	Sept. 15		Sept. 15	Dec.
53	do	38	25	1,400	W.	do	1903	11	Apr. 11	Apr. 21		Apr. 9		Sept. –		Nov. –	Do.
53	do	38	25	1,400	W.	do	1905	19	Apr. 18	Apr. 28	Apr. 24	Apr. 6		do	Oct. –	Oct. –	Do.
53	do	38	25	1,400	W.	do	1906	20	Apr. 25	May 1	May 11	Apr. 15		Sept. 25		do	Do.
48	do	38	45	375	SE.	Porous loam	1903	10	Apr. 8	Apr. 11	Apr. 5	Apr. 16	July 1	Sept. 1	Oct. 25		Do.
48	do	38	45	375	SE.	do	1906	15	Apr. 27	Apr. 29	May 11	May 1			Oct. 11	Aug. 15	Oct.
48	do	38	45	375	SE.	do	1907	16	Apr. 29	May 1	Apr. 29			Sept. 20	Oct. 13		Dec.
54	do	39	0	1,000	NE.	do	1902	9	Apr. 24	Apr. 29	Apr. 14	Apr. 15	June 15	Sept. 10		Sept. 15	Do.
54	do	39	0	1,000	NE.	do	1903	10	Apr. 6	Apr. 20	Apr. 5	Mar. 31	June 10	do		Sept. 20	Do.
54	do	39	0	1,000	NE.	do	1904	16	May 4	May 8	Apr. 20	Apr. 25	do				
54	do	39	0	1,000	NE.	do	1905	17	Apr. 19	Apr. 26	Apr. 19	Apr. 7	do	Sept. 25			

TABLE IV.—*Phenological records—Apples*—Continued.

GRIMES—Continued.

Observer's number.	State.	Approximate latitude.	Elevation (feet).	Slope.	Soil.	Year.	Age of tree (yrs.).	Date first bloom.	Date full bloom.	Date last spring frost.	Date leaf buds begin to open.	Date terminal buds begin to form.	Date picked (first picking).	Date first fall frost.	Date fit for use.	Keeps until—
		° ′														
54	Virginia	39 0	1,000	NE.	Porous loam	1906	10	Apr. 23	Apr. 28	May 8	Apr. 19	June 10	Sept. 15	.....	Oct. 1	Mar.
54	....do	39 0	1,000	NE.	....do	1907	19	Apr. 20	Apr. 25	Apr. 23	Mar. 31	...do	...do	.....	...do	Jan.
72	Delaware	39 10	70	None.	Sandy loam	1902	10	Apr. 22	Apr. 26	.....	.....	.....	Sept. 5	Oct. 20	Sept. 15	Dec.
37	Virginia	39 10	600	NW.	Clay loam	1903	.....	Apr. 16	Apr. 21	.....	.....	.....	.....	.....	.....	.....
68	Maryland	39 10	550	S.	....do	1906	9	Apr. 20	May 1	May 10	Apr. 17	.....	Sept. 15	Oct. 12	.....	.....
64	....do	39 25	225	SE.	Stony loam	1905	20	Apr. 28	.....	Apr. 19	Apr. 25	Aug. 20	Sept. 1	Oct. 19	Aug. 15	Nov.
64	....do	39 25	225	SE.	....do	1906	15	Apr. 29	May 3	May 10	May 2	...do	.....	Oct. 11	.....	.....
64	....do	39 25	225	SE.	....do	1907	25	Apr. 28	May 6	May 5	Apr. 28	.....	.....	Oct. 17	.....	.....
82	New Jersey	39 55	50	W.	Sandy loam	1902	6	Apr. 25	May 2	.....	.....	.....	Sept. 1	.....	Sept. 1	Oct.
84	....do	39 55	50	N.	Heavy loam	1902	10	Apr. 27	May 1	Apr. 16	Apr. 20	Sept. 10	Sept. 25	Oct. 10	Oct. 1	Do.

JERSEY SWEET.

33	Virginia	37 0	5	SW.	Sandy loam	1904	8	Apr. 18	Apr. 29	Apr. 20	Apr. 1	June 26	Aug. 4	Oct. 17	Aug. 4	Aug. 10.
38	....do	37 15	2,170	NW.	Limestone clay	1902	13	Apr. 28	May 2	Apr. 8	Apr. 10	.....	.....	Sept. 14	.....	.....
38	....do	37 15	2,170	NW.	....do	1903	14	Apr. 14	Apr. 26	Apr. 5	Mar. 29	.....	.....	...do	.....	.....
38	....do	37 15	2,170	NW.	....do	1904	15	May 1	May 12	May 16	Apr. 17	June 26	.....	Oct. 15	.....	.....
94	New Jersey	40 20	140	SW.	Sandy loam	1905	41	Apr. 30	May 5	Apr. 19	.....	.....	Aug. 10	.....	Aug. 10	Aug.

JONATHAN.

47	Virginia	36 45	1,700	SE.	Porous loam	1905	.....	Apr. 15	May 1	May 1	.....	.....	Sept. 15	.....	Oct. 1	Dec.
72	Delaware	39 10	70	None.	Sandy loam	1902	7	Apr. 25	Apr. 28	.....	.....	.....	...do	Oct. 20	Sept. 15	Do.
82	New Jersey	39 55	50	W.	....do	1902	6	Apr. 24	Apr. 29	.....	.....	.....	Sept. 25	.....	Sept. 20	Do.
82	....do	39 55	50	W.	....do	1903	7	Apr. 16	.....	.....	.....	.....	.....	.....	.....	.....
99	....do	40 35	40	NW.	....do	1907	10	May 9	May 13	May 12	May 1	Sept. 15	Oct. 15	.....	Oct. –	Apr.

JULY.

76	Delaware	39	5	40	None.	Sandy	1903	8	Apr. 11	Apr. 16	Apr. 6	Apr. 1	June 1	July 8			July.
76	do	39	5	40	None.	do	1905	10	Apr. 20	Apr. 24	Apr. 19	do	June 7	July 12	Oct. 22		
72	do	39	10	70	None.	Sandy loam	1902	10	Apr. 24	Apr. 27				July 10	Oct. 20		
65	Maryland	39	20	75		Gravelly loam	1902	5	Apr. 25	Apr. 29		Apr. 12					
65	do	39	20	75		do	1903	6	Apr. 18			Apr. 2					

LIMBERTWIG.

11	North Carolina	35	25	1,990	SE.	Porous loam	1904	20	Apr. 30	May 5	Apr. 21	May 8		Oct. 20	Oct. 24	Dec. –	Mar.
10*b*	do	35	30	3,500	SE.	Gravelly clay	1902	12	Apr. 29	May 7	Apr. 20	May 10	July 28	Oct. 10	Oct. 3	do	Jan.
10*c*	do	35	30	4,000	NE.	Clay loam	1902	8	May 1	May 9	Apr. 25	May 8	do	Oct. 20	do	do	Mar.
10*d*	do	35	30	4,500	SE.	Black loam	1902	12	do	May 6	Apr. 22		July 30	do	Oct. 1	do	Feb.
1	do	35	35	2,300	S.	Loam	1904	12	Apr. 15	Apr. 28	Apr. 20	Apr. 3					
1	do	35	35	2,300	S.	do	1905	13	Apr. 5	Apr. 15	Apr. 16	Mar. 27		Oct. 15	Oct. 15	Jan. –	
1	do	35	35	2,300	S.	do	1906	9	Apr. 20	Apr. 26	Apr. 18	Apr. 15			do		
5	do	35	50	1,500	N.	Black loam	1905	15	Apr. 10	Apr. 18	Mar. 30	Apr. 2	May 5	Nov. 1	Oct. –	Oct. –	May.
5	do	35	50	1,500	N.	do	1906	18	Mar. 30	Apr. 9				do		do	Mar.
4	do	35	50	1,200	S.	Sandy loam	1904	20	Apr. 15	May 1		May 15		do		do	Apr.
16	do	36	10	3,250	S.	Clay loam	1904	16	May 10	May 20	Apr. 21	Apr. 23	July 6	Oct. 15	Oct. 15	Jan. –	May.
16	do	36	10	3,250	S.	do	1905	17	Apr. 25	May 4	May 16	Apr. 16	July 11	do	Oct. 20	do	Do.
47	Virginia	36	45	1,700	SE.	Porous loam	1905		Apr. 20	May 5	May 1			Oct. 25		do	June.
38	do	37	15	2,170	NW.	Limestone clay	1902	13	Apr. 28	May 4	Apr. 18	Apr. 11		Sept. 25	Sept. 14		
38	do	37	15	2,170	NW.	do	1903	14	Apr. 17	Apr. 29	Apr. 5	Mar. 30		Oct. 1	do		
38	do	37	15	2,170	NW.	do	1904	15	May 6	May 11	May 16	Apr. 24	June 30		Oct. 15		
44	do	37	45	630	SW.	Loam	1904	15	Apr. 24		Apr. –[a]	Apr. 6	do				
50	do	37	55	200	E.&W.	Sandy loam	1903	16	Mar. 29	Apr. 4		Apr. 5		Oct. –		Oct. –	Mar.
19	do	38	5	900	S.	Red clay	1905	18	Apr. 11	Apr. 15	Apr. 19	Apr. 1		Oct. 25	Oct. 7	Mar. –	May.

LONDON SWEET.

35	Virginia	38	30	400	NE.	Red clay	1902	15	Apr. 24	Apr. 26	Apr. 15	Apr. 16	Aug. 27		Oct. 22		
35	do	38	30	400	NE.	do	1903	16	Apr. 7	Apr. 14	Apr. 5	Mar. 20	Aug. 2	Aug. 22	Oct. 18	Aug. –	Oct.
35	do	38	30	400	NE.	do	1904	17	Apr. 30	May 5	Apr. 23	Apr. 8	Aug. 22	Sept. 1	Sept. 23	do	Do.
35	do	38	30	400	NE.	do	1905	18	Apr. 14	Apr. 22	Apr. 20	Mar. 30	July 16	do	Oct. 13	do	Sept.

[a] Frost seriously injured crop.

TABLE IV.—*Phenological records—Apples*—Continued.

MAIDEN BLUSH.

Observer's number.	State.	Approximate Latitude.	Elevation (feet).	Slope.	Soil.	Year.	Age of tree (yrs.).	Date first bloom.	Date full bloom.	Date last spring frost.	Date leaf buds begin to open.	Date terminal buds begin to form.	Date picked (first picking).	Date first fall frost.	Date fit for use.	Keeps until—
		° ′														
38	Virginia	37 15	2,170	NW.	Limestone clay	1902	13	Apr. 27	May 3	Apr. 18	Apr. 10			Sept. 14		
38	do	37 15	2,170	NW.	do	1903	14	Apr. 15	Apr. 27	Apr. 15	Apr. 6			do		
38	do	37 15	2,170	NW.	do	1904	15	May 8	May 13	May 16	Apr. 22	June 27		Oct. 15		
31	do	37 25	1,400	NW.	Gravelly loam	1902	12	Apr. 20	Apr. 24	Apr. 8	Apr. 20	July —	Sept. 25		Sept. 1	Dec.
35	do	38 30	400	NE.	Red clay	1902	15	Apr. 24	Apr. 26	Apr. 15	Apr. 13	Aug. 25	Aug. 1	Oct. 22	July 25	Aug.
35	do	38 30	400	NE.	do	1903	16	Apr. 7	Apr. 12	Apr. 5	Mar. 20	July 28	Aug. 15	Oct. 18	July 1	Sept.
35	do	38 30	400	NE.	do	1904	17	May 2	May 5	Apr. 23	Apr. 9	July 17		Sept. 23		
35	do	38 30	400	NE.	do	1905	18	Apr. 16	Apr. 24	Apr. 20	Mar. 30	July 14	Aug. 1	Oct. 13	July 10	Sept.
54	do	39 10	1,000	NE.	Porous loam	1903	20	Apr. 9	Apr. 20	Apr. 5	Mar. 28	June 10	do			Aug.
54	do	39 10	1,000	NE.	do	1905	17	Apr. 20	Apr. 25	Apr. 19	Apr. 6	do				
54	do	39 10	1,000	NE.	do	1907	19	do	do	Apr. 23	Mar. 31	June 15	Aug. 15		Aug. 15	Sept.
55	do	39 10	600	E.	Sandy loam	1907	14	Apr. 24	Apr. 30	May 9	Mar. 27		do		Aug. 25	Do.
72	Delaware	39 10	70	None.	do	1903	30	Apr. 22	Apr. 26				Aug. 1	Oct. 20	Aug. 5	Do.
89	New Jersey	39 40	150	None.	Porous loam	1904	25	May 5	May 10	Apr. 17	May 2	June 15	Aug. 5	Sept. 25	do	
82	do	39 55	50	W.	Sandy loam	1902	20	Apr. 24	Apr. 28				Aug. 15		Aug. 15	Sept.
94	do	40 20	150	S.	do	1902	38	Apr. 27	May 4	Apr. 28	Apr. 20	June 27	Aug. 10	Oct. 10	Aug. —	Do.
94	do	40 20	150	S.	do	1903	39	Apr. 28	May 2	May 5	Apr. 9	June 13	Aug. 18	Oct. —	do	Aug.
94	do	40 20	150	S.	do	1904	40	May 7	May 11		Apr. 30	July 16	Aug. 25	Sept. 20	Sept. 1	Sept.

MILAM.

53	Virginia	38 25	1,400	W.	Gravelly loam	1903	9	Apr. 12	Apr. 24		Apr. 9		Sept. —		Nov. —	Feb.
53	do	38 25	1,400	W.	do	1905	11	Apr. 17	Apr. 25	Apr. 24	Apr. 11		do		Sept. —	Jan.
53	do	38 25	1,400	W.	do	1906	12	Apr. 27	May 2	May 11	Apr. 13		do			
54	do	39 0	1,000	NE.	Porous loam	1902	15	Apr. 24	Apr. 29	May 14	Apr. 17	June 15	Sept. 10		Sept. 15	Nov.
54	do	39 0	1,000	NE.	do	1903	16	Apr. 13	Apr. 22	May 5	Apr. 4	June 10	Sept. 25		Oct. 1	Dec.
54	do	39 0	1,000	NE.	do	1904	17	May 5	May 10	May 20	Apr. 22	do				
54	do	39 0	1,000	NE.	do	1905	18	Apr. 22	Apr. 25	May 19	Apr. 10	do				

NERO.

38	Virginia	37	15	2,170	NW.	Limestone clay	1902	13	Apr. 26	May 3	Apr. 18	Apr. 10			Sept. 14		
38	do	37	15	2,170	NW.	do	1903	14	Apr. 15	Apr. 20	Apr. 5	Apr. 13		Sept. 25	do		
38	do	37	15	2,170	NW.	do	1904	15	May 3	May 8	May 16	Apr. 16	June 26		Oct. 15		
76	Delaware	39	5	40	NE.	Sandy loam	1903	19	Apr. 8	Apr. 20	Apr. 6	Mar. 28	June 16	Oct. 5			Jan.
76	do	39	5	40	NE.	do	1904	20	Apr. 27	May 4	Apr. 21	Apr. 23	June 14	Oct. 18	Oct. 28		Feb.
76	do	39	5	40	NE.	do	1905	21	Apr. 19	Apr. 25	Apr. 19	Mar. 28	May 30	Oct. 19	Oct. 22	Nov. 1	Do.
82	New Jersey	39	55	50	W.	do	1902	6	Apr. 24	Apr. 28				Oct. 1		Oct. 1	Dec.
82	do	39	55	50	W.	do	1903	7	Apr. 16								
93	do	40	15	200	SE.	do	1907	20	May 8	May 11	May 30	May 1		Nov. 1	Nov. –	Dec. –	Mar.
94	do	40	20	150	S.	do	1902	38	Apr. 22	Apr. 23	Apr. 28	Apr. 20	June 27	Oct. 10	Oct. 10	Nov –	Dec.
94	do	40	20	150	S.	do	1903	39	Apr. 20	Apr. 26	May –	Apr. 9	June 13	Oct. 1	Oct. –	do	Feb.
94	do	40	20	150	S.	do	1905	41	Apr. 27	May 1	Apr. 19			Oct. –	do	Oct. –	Nov.

NORTHERN SPY.

4	North Carolina	35	50	1,200	S.	Sandy loam	1904	20	Apr. 15	May 1		May 15					
38	Virginia	37	15	2,170	NW.	Limestone clay	1902	13	Apr. 30	May 5	Apr. 18	Apr. 11			Sept. 14		
38	do	37	15	2,170	NW.	do	1903	14	do	May 12	Apr. 5	Apr. 16		Sept. 20	do	Oct. 1	Dec.
38	do	37	15	2,170	NW.	do	1904	15	May 9	May 14	May 16	Apr. 28	June 24		Oct. 15		
29	do	37	20	1,200	SE.	Red clay	1903	20	Apr. 10	Apr. 18	Apr. 6	Apr. 20		Aug. –		Sept. –	Dec.
28	do	37	20	1,000	None.	Sandy loam	1904	15	Apr. 15	Apr. 25	May 7			Oct. 20		Oct. –	Late.
28	do	37	20	1,000	None.	do	1905	10	Apr. 9	Apr. 16	Mar. 28	Apr. 1	June 10		Oct. 13		
28	do	37	20	1,000	None.	do	1906	20	Apr. 12	Apr. 19	Mar. 29	Apr. 2			Nov. 20		
54	do	39	0	1,000	NE.	Porous loam	1902	8	Apr. 26	Apr. 30	Apr. 14	Apr. 22	June 15	Sept. 20		Oct. 1	
54	do	39	0	1,000	NE.	do	1903	9	Apr. 18	Apr. 27	Apr. 5	Apr. 6	June 10	Sept. 25	do		
54	do	39	0	1,000	NE.	do	1904	10	May 6	May 11	Apr. 20	May 2	do				Dec.
54	do	39	0	1,000	NE.	do	1905	11	Apr. 24	Apr. 29	Apr. 19	Apr. 11	do	Sept. 20			
54	do	39	0	1,000	NE.	do	1906	18	Apr. 28	May 2	May 8	Apr. 20	do	Oct. 1		Oct. 1	Mar.
54	do	39	0	1,000	NE.	do	1907	19	Apr. 29	May 4	Apr. 23	Apr. 4	June 15	do		Dec. –	Do.
73	Delaware	39	10	100		Sandy loam	1902	20	Apr. 28	do		Apr. 10		do		Oct. 15	Dec.
60	Maryland	39	35	75	SSW.	Heavy loam	1902	25	May 1	do	May 28	Apr. 28	July 12	Sept. 16	Nov. 15	Aug. 12	Feb.
60	do	39	35	75	SSW.	do	1903	26	Apr. 28	May 2	Apr. 20	Apr. 6			Nov. –		
60*a*	do	39	35	125	SSW.	Sandy loam	1902	35	Apr. 29	do	do	Apr. 25	July 10	Sept. 16	Nov. 15	Aug. 10	Feb.
60*a*	do	39	35	125	SSW.	do	1903	36	Apr. 20	Apr. 26	do	Apr. 4		Sept. 20	Nov. –		
60*a*	do	39	35	125	SSW.	do	1904	37	May 4	May 13	Apr. 21	May 1	July 3	Oct. 3	Sept. 17		
96	New Jersey	40	15	90	N.& S.	Clay loam	1903	19	Apr. 25			May 7					
96	do	40	15	90	N.& S.	do	1904	20	May 8	May 18	Apr. 22	May 5					
92	do	40	15	200	SE.	do	1906	35	Apr. 26	May 3	May 10			Oct. 15	Oct. –	Oct. 15	Jan.
92	do	40	15	200	SE.	do	1907	36	May 11	May 15	May 22	May 5	June 10	Oct. 1	do	Dec. 25	Do.
94	do	40	20	150	S.	Sandy loam	1904	40				May 1	July 16	Aug. –		Aug. 10	Sept.
94	do	40	20	150	S.	do	1905	41	May 4	May 7	Apr. 19			Sept. –	Oct –	Sept. –	Oct.
94	do	40	20	150	S.	do	1906	42	May 5	May 10	May –	Apr. 22	June 5	Sept. –	do	do	
94	do	40	20	150	S.	do	1907	43	May 16	May 20		May 23	July 4	Sept. 20	Oct. 20	Oct. –	Oct.
98	do	40	30	600	S.	Red shale	1905	14	May 3	May 12	Apr. 16	May 6			Oct. –		
104	do	41	0	600	None.	Clay loam	1904	12	May 13		Apr. 23	May 8	July 6	Oct. 18	Sept. 22	Nov. –	Jan.
104	do	41	0	600	None.	do	1905	14	May 8	May 17	Apr. 24	May 28	July 8	Oct. 10	Oct. 22	do	Mar.

TABLE IV. *Phenological records—Apples*—Continued.

NORTHERN SPY—Continued.

Observer's number.	State.	Approximate latitude.	Elevation (feet).	Slope	Soil.	Year.	Age of tree (yrs.).	Date first bloom.	Date full bloom.	Date last spring frost.	Date leaf buds begin to open.	Date terminal buds begin to form.	Date picked (first picking).	Date first fall frost.	Date fit for use.	Keeps until—
		° ′														
104	New Jersey	41 0	600	None.	Clay loam	1906	15	May 12	...do....	May 11	Apr. 30	July 2	Oct. 12	Oct. 12	Nov. –	Jan.
104	.....do	41 0	600	None.	.....do	1907	16	May 17	May 22	May 12	May 1	July 5	Oct. 24	Oct. 25	...do....	Mar.
102	.....do	41 10	800	None.	Sandy loam	1904	23	May 13	May 19							
102	.....do	41 10	800	None.	.....do	1905	24	May 9		Apr. 26					Dec. –	Apr.
103	.....do	41 15	400	SW.	.....do	1904		May 12	May 16	May 5				Sept. 28		
					OLDENBURG.											
33	Virginia	37 0	5	None.	Sandy loam	1903	7			Apr. 5	Mar. 24		July 22	Oct. 27	July 25	July 30.
33	.....do	37 0	5	None.	.....do	1904	8	Apr. 12	Apr. 24	Apr. 20	Apr. 1	June 23	July 18	Oct. 17	July 20	July 28.
38	.....do	37 15	2,170	NW.	Limestone clay	1902	13	Apr. 26	May 2	Apr. 18	Apr. 11			Sept. 14		
38	.....do	37 15	2,170	NW.	.....do	1903	14	Apr. 20	Apr. 28	Apr. 5	Mar. 27			...do....		
38	.....do	37 15	2,170	NW.	.....do	1905	15	Apr. 29	May 7	May 16	Apr. 21	June 22		Oct. 15		
31	.....do	37 25	1,400	NW.	Gravelly loam	1902	12	Apr. 21	Apr. 24	Apr. 8	...do...	July –	July 1		July 1	Aug. –.
35	.....do	38 30	400	NE.	Red clay	1902	3			Apr. 15	Apr. 12	Aug. 26		Oct. 22		
35	.....do	38 30	400	NE.	.....do	1903	4	Apr. 8	Apr. 13	Apr. 5	Mar. 29	Aug. 3		Oct. 18		
35	.....do	38 30	400	NE.	.....do	1904	5	Apr. 29	May 5	Apr. 23	Apr. 10	July 17	Aug. 1	Sept. 23	July 25	Aug. 15.
35	.....do	38 30	400	NE.	.....do	1905	6	Apr. 17	Apr. 23	Apr. 20	Apr. 3	July 24		Oct. 13	July 7	Aug. 19.
35	.....do	38 30	400	NE.	.....do	1906	7	Apr. 19	Apr. 25	May 10	Apr. 15	July 22	Aug. 9	Oct. 11	Aug. 1	Sept. 10
48	.....do	38 45	375	SE.	Porous loam	1905		Apr. 21	Apr. 23	Apr. 19						
57	Maryland	39 0	75	None.	Sandy	1907		Apr. 22	May 2	Apr. 18	Mar. 25					
87	New Jersey	39 15	40	SW.	Sandy loam	1902	10	Apr. 28	May 5		Apr. 22					
63	Maryland	39 30	150	N.	Clay loam	1907	20	Apr. 29	May 8	May 12	Apr. 18	July 29	Aug. 10	Oct. 15	Aug. 1	Aug. 20.
84	New Jersey	39 55	50	N.	Heavy loam	1902	25	Apr. 25	Apr. 30	Apr. 16	Apr. 20	Aug. 1	July 25	Oct. 10	July 25	Aug. 10.
84	.....do	39 55	50	N.	.....do	1903	26	Apr. 18	Apr. 27	May 2	Apr. 5	July 25	July 30	Oct. –	July 30	Do.
84	.....do	39 55	50	N.	.....do	1904	27	May 1	May 6		Apr. 27	July 10	July 15		July 25	Aug. 1.
86	.....do	40 0	50	NW.	Loam	1904	20	...do...	May 5		Apr. 25	...do....	July 10	Sept. 22	July 10	Do.
86	.....do	40 0	50	NW.	.....do	1905	21	Apr. 27	May 2		Apr. 1	July 1		Nov. –	July 15	Do.
81	.....do	40 10	75	None.	Heavy loam	1907	12	May 2	May 10		Apr. 28			Oct. 21		
94	.....do	40 20	150	SW.	Sandy loam	1904	14	May 8	May 11		...do....	July 16		Sept. 20		
94	.....do	40 20	150	SW.	.....do	1905	15	May 1	May 5	Apr. 19						
104	.....do	41 0	350	None.	Clay loam	1904	12	May 9	May 13	Apr. 23	May 2	July 1	Sept. 8	Sept. 22	Sept. 20	Oct.
104	.....do	41 0	350	None.	.....do	1905	16	May 6	May 10	Apr. 24	Apr. 26	...do....	Aug. 18	Oct. 22	Aug. 18	
104	.....do	41 0	350	None.	.....do	1906	12	May 5	May 11	May 11	Apr. 20	June 26	Aug. 21	Oct. 12	Aug. 30	
104	.....do	41 0	350	None.	.....do	1907	13	May 13	May 18	May 12	Apr. 27	July 28	Aug. 19	Oct. 25	Aug. 19	
103	.....do	41 15	400	SW.	Sandy loam	1904		May 8	May 13	May 5				Sept. 28		

94	New Jersey	40	20	140	S.	Sandy loam	1902	38	Apr. 23	Apr. 27	Apr. 28	Apr. 20	June 27	July 8	Oct. 10	July 8	Aug. 1.
94	do	40	20	140	S.	do	1903	39	Apr. 20	do	May –	Apr. 9	June 13	do	Oct. –	July 1	July.
94	do	40	20	140	S.	do	1904	40	May 4	May 10		Apr. 20	June 16	July 14	Sept. 20	July 15	July 25.
94	do	40	20	140	S.	do	1905	41	Apr. 30	May 4	Apr. 19			do		do	Aug. 1.
94	do	40	20	140	S.	do	1906	42	do	May 5		Apr. 18	June 5	July 11	Oct. –	July 13	July 20.

RALLS. Synonyms: *Geniton, Rawles Genet, Neverfail.*

47	Virginia	36	45	1,700	SE.	Porous loam	1905		May 10	May 20	May 1					Dec. 1	Apr.
26	do	37	15	900	N.	Sandy loam	1902	15	Apr. 26	May 8							
26	do	37	15	900	N.	do	1903	16	Apr. 19	Apr. 25			June 25	Oct. 10		Nov. 15	Jan.
38	do	37	15	2,170	NW.	Limestone clay	1903	14	May 7	May 12	Apr. 5	Mar. 29			Sept. 14		
38	do	37	15	2,170	NW.	do	1904	15			May 16	May 6	July 15		Oct. 15		
28	do	37	20	1,000	N.	Porous loam	1904	5	May 15	May 25	May 7			Oct. 20			
25	do	37	20	1,000	SE.	Cecil clay	1902	15	May 1	May 10	Mar. 20	May 1	Aug. 1	Oct. 15	Oct. 20	Jan. 1	Mar.
25	do	37	20	1,000	SE.	do	1903	16	May 10	May 20	Apr. 20	May 10	do	Nov. 1	Oct. 15	Dec. 1	Feb.
25	do	37	20	1,000	SE.	do	1904	17	May 15	May 25	May 5	May 15	July 20	do	Oct. 10	do	Do.
25	do	37	20	1,000	SE.	do	1905	18	May 10	May 20	Apr. 15	May 10	do	do	Oct. 20	do	Mar.
27	do	37	30	1,000	NE.	Clay loam	1902	26	May 1	May 4	Mar. –	Apr. 20		Oct. 15	Nov. –	do	Feb.
27	do	37	30	1,000	NE.	do	1904	28	do	May 3	Apr. 22			Sept. 15	Oct. 16	Nov. –	Do.
42	do	37	45	800	SE.	Cecil clay	1903	15	Apr. 26	May 10	Apr. 15						
36	do	38	15	650		Sandy loam	1902	18	Apr. 24	Apr. 28	May 3	Apr. 24			Oct. 17		
53	do	38	25	1,400	W.	Gravelly loam	1905	19	May 4	May 12	Apr. 24	May 1			Oct. –		
53	do	38	25	1,400	W.	do	1906	20	May 6	May 14	May 11	Apr. 28		Oct. 15	Oct. 8	Dec.	Apr.
35	do	38	30	400	NE.	Red clay	1902	2			Apr. 15	Apr. 22	Aug. 29		Oct. 22		
35	do	38	30	400	NE.	do	1903	3			Apr. 5	Apr. 13	Aug. 4		Oct. 18		
35	do	38	30	400	NE.	do	1904	4	May 7	May 9	Apr. 23	Apr. 29	July 20	Oct. 1	Sept. 23		
35	do	38	30	400	NE.	do	1905	5			Apr. 20	Apr. 14	July 18		Oct. 13		
48	do	38	45	375	SE.	Porous loam	1903	15	Apr. 16	Apr. 22	Apr. 5	Apr. 24	July 8	Sept. 30	Oct. 25		Feb.
48	do	38	45	375	SE.	do	1905	20	Apr. 26	Apr. 28	Apr. 19	Apr. 27					
48	do	38	45	375	SE.	do	1906	60	Apr. 28	Apr. 30	May 11	May 4			Oct. 11	Sept.	Jan.
48	do	38	45	375	SE.	do	1907		May 8	May 11	Apr. 20			Sept. 20	Oct. 13		Do.
54	do	39	0	1,000	NE.	do	1902	19	Apr. 30	May 3	Apr. 14	Apr. 23	June 20	Oct. 1		Nov.	Late.
54	do	39	0	1,000	NE.	do	1903	20	Apr. 27	May 2	Apr. 5	Apr. 29	June 10	Oct. 26		Dec.	June.
54	do	39	0	1,000	NE.	do	1904	21	May 8	May 13	Apr. 20	May 2	do				
54	do	39	0	1,000	NE.	do	1905	22	Apr. 26	May 1	Apr. 19	Apr. 17	do				
54	do	39	0	1,000	NE.	do	1906	23	May 1	May 5	May 8	Apr. 23	do	Oct. 1		Oct.	Apr.
54	do	39	0	1,000	NE.	do	1907		Apr. 30	do	Apr. 23	Apr. 4	June 15	do		Dec.	June.
55	do	39	0	600	E.	do	1907	14	May 4	May 11	May 9	Apr. 15		Nov. 1	Oct. 10	do	Apr.
69	Maryland	39	15	50	None.	Sandy loam	1904	14	Apr. 28	May 14		Apr. 28					
94	New Jersey	40	20	150	S.	do	1905	41	May 4	May 8	Apr. 19	Apr. 20		Oct. –	Oct. –		June.
94	do	40	20	150	S.	do	1907	43	May 13	May 16		May 28	July 4		Oct. 20		

TABLE IV.—*Phenological records—Apples*—Continued.

RED ASTRACHAN.

Observer's number.	State.	Approximate latitude.	Elevation (feet).	Slope.	Soil.	Year.	Age of tree (yrs.).	Date first bloom.	Date full bloom.	Date last spring frost.	Date leaf buds begin to open.	Date terminal buds begin to form.	Date picked (first picking).	Date first fall frost.	Date fit for use.	Keeps until—
		° ′														
12	North Carolina	35 25	2,128	W.	Porous loam	1902	19	Apr. 18	Apr. 24	Apr. 5	Apr. 16	June 25	July 1	Oct. 15	June 22	July 10.
12	do	35 25	2,128	W.	do	1903	20	Mar. 31	Apr. 7	Apr. 6	Apr. 8					
12	do	35 25	2,128	W.	do	1904	21	Apr. 12	Apr. 20	Apr. 11	Apr. 22	July 26	July 10	Oct. 15	July 12	Aug. 1.
12	do	35 25	2,128	W.	do	1905	22	Apr. 2	Apr. 10	Apr. 7	Apr. 12	July 16	July 15	Oct. 14	July 15	July 25.
1	do	35 35	2,300	S.	Sandy loam	1902	10	Apr. 20	Apr. 26	Apr. 18	do			Oct. 15	June 15	Aug. 1.
1	do	35 35	2,300	S.	do	1904	12	Apr. 12	Apr. 28	Apr. 20	Apr. 3			do		
1	do	35 35	2,300	S.	do	1905	8	Apr. 5	Apr. 15	Apr. 16	Mar. 27			Oct. 16		
1	do	35 35	2,300	S.	do	1906	9	Apr. 20	Apr. 26	Apr. 18	Apr. 12			Oct. 15		
5	do	35 50	1,500	N.	Black loam	1905	18	Mar. 30	Apr. 15	Mar. 30	Mar. 20	May 1	July 15	Oct –	June 30	Aug. 15.
17	do	36 15	3,000	SE.	Clay loam	1904	10	Apr. 25	May 1	May 3	May 1		Aug. 5	Oct. 11	July 25	Sept. 1.
33	Virginia	37 0	5	None.	Sandy loam	1903	7	Mar. 31	Apr. 10	Apr. 5	Mar. 22		July 5	Oct. 27	July 5	July 15.
33	do	37 0	5	None.	do	1904	8	Apr. 12	Apr. 20	Apr. 20	Mar. 27	June 28	July 20	Oct. 17	July 20	July 26.
26	do	37 0	5	None.	do	1902	15	Apr. 19	Apr. 25			June 5	June 18		June 15	July 28.
26	do	37 0	5	None.	do	1903	16	Apr. 1	Apr. 8							
46	do	37 0	500	S.	do	1903	15		Apr. 2		Apr. 1					
38	do	37 0	2,170	NW.	Limestone clay	1902	13	Apr. 28	May 2	Apr. 18	Apr. 11		Sept. 14			
38	do	37 0	2,170	NW.	do	1903	14	Apr. 16	Apr. 20	Apr. 5	Mar. 30		do			
38	do	37 0	2,170	NW.	do	1904	15	May 4	May 10	May 16	Apr. 20	June 20		Oct. 15		
31	do	37 25	1,400	NW.	Gravelly loam	1902	12	Apr. 21	Apr. 24	Apr. 8	Apr. 21	July –	July 1		July 1	Aug.
50	do	37 55	200	E.&W.	Sandy loam	1902	15	Apr. 17	Apr. 23	Apr. 19	May 10		July –	Oct. 30	July –	Aug. 15.
50	do	37 55	200	E.&W.	do	1903	16	Mar. 28	Apr. 2		Apr. 5		do		July 5	Aug. 1.
50	do	37 55	200	E.&W.	do	1904	17	Apr. 20	Apr. 25	Apr. 6	Apr. 25		July 1	Sept. 7		
50	do	37 55	200	E.&W.	do	1905	18	Apr. 9	Apr. 14	Apr. 19	Apr. 14		do	Oct. 22	July 1	Aug. 1.
50	do	37 55	200	E.&W.	do	1906	19	Apr. 15	Apr. 25	May 11	Apr. 25		July 5		July 5	Do.
35	do	38 30	400	NE.	Red clay	1902	3	Apr. 25	Apr. 27	Apr. 15	Apr. 13	Aug. 23		Oct. 22		
35	do	38 30	400	NE.	do	1903	4	Apr. 1	Apr. 9	Apr. 5	Mar. 21	Aug. 1	July 15	Oct. 18		
35	do	38 30	400	NE.	do	1904	5	May 1	May 6	Apr. 23	Apr. 9	July 11		Sept. 23		
35	do	38 30	400	NE.	do	1905	6	Apr. 10	Apr. 18	Apr. 20	Mar. 31	July 13		Oct. 13		
35	do	38 30	400	NE.	do	1906	7	Apr. 19	Apr. 23	May 10	Apr. 10	July 16		Oct. 11		
61	Maryland	38 40	45	None.	Sandy loam	1907	15	Apr. 12	Apr. 29							
48	Virginia	38 45	375	SE.	Porous loam	1903	15	Apr. 5	Apr. 8	Apr. 5	Apr. 15	June 28		Oct. 25		
48	do	38 45	375	SE.	do	1905	20	Apr. 20	Apr. 24	Apr. 19	Apr. 20					
48	do	38 45	375	SE.	do	1906	33	Apr. 24	Apr. 27	May 11	Apr. 30		June 28	Oct. 11	June 24	July 11.
48	do	38 45	375	SE.	do	1907	.....	Apr. 22	Apr. 26	Apr. 20				Oct. 13		Aug. 20.
78	Delaware	38 45	50	None.	Sandy loam	1904	21	Apr. 25	May 4	Apr. 22	Apr. 13					
75	do	39 0	60	None	do	1907	20	Apr. 20	Apr. 26	Apr. 3	Apr. 18		July 9	Oct. –	July 9	
54	Virginia	39 0	1,000	NE.	Porous loam	1902	18	Apr. 22	Apr. 24	Apr. 14	Apr. 15	June 15	June 28		June 28	July 15.

54	.....do.....	39	0	1,000	NE.	.....do.....	1903	19	Apr. 8	Apr. 18	Apr. 5	Mar. 25	June 10	July 1	.....	July 4	Do.
54	.....do.....	39	0	1,000	NE.	.....do.....	1904	20	May 1	May 6	Apr. 20	Apr. 20	...do.....	.....	.....	.....	.....
54	.....do.....	39	0	1,000	NE.	.....do.....	1905	21	Apr. 14	Apr. 24	Apr. 19	Apr. 5	...do.....	.....	.....	.....	.....
54	.....do.....	39	0	1,000	NE.	.....do.....	1906	22	Apr. 20	Apr. 27	May 8	Apr. 16	...do.....	July 1	.....	July 1	Aug.
54	.....do.....	39	0	1,000	NE.	.....do.....	1907	19	Apr. 17	Apr. 24	Apr. 23	Mar. 31	June 15	...do.....	.....	...do.....	Aug. 15.
76	Delaware.....	39	5	40	None.	Sandy.....	1903	15	Apr. 3	Apr. 18	Apr. 6	Mar. 28	June 28	June 29	.....	.....	.....
76	.....do.....	39	5	40	None.	.....do.....	1904	16	Apr. 29	Apr. 30	Apr. 21	Apr. 16	June 14	July 11	Oct. 28	July 11	July 23.
76	.....do.....	39	5	40	None.	.....do.....	1905	17	Apr. 19	Apr. 21	Apr. 19	Mar. 30	June 2	July 4	Oct. 22	.....	Aug.
72	.....do.....	39	10	70	None.	Sandy loam.....	1902	25	Apr. 22	Apr. 26	.....	.....	.....	July 5	Oct. 20	July 5	.....
73	.....do.....	39	10	70	None.	.....do.....	1902	20	Apr. 25	May 1	.....	Apr. 10	.....	July 10	.....	July 10	.....
74	.....do.....	39	10	70	None.	.....do.....	1903	8	Apr. 17	Apr. 22	Apr. 6	.....	.....	July 20	Oct. 22	July 20	.....
69	Maryland.....	39	15	50	None.	.....do.....	1904	14	Apr. 28	May 5	.....	Apr. 28	.....	.....	.....	.....	.....
87	New Jersey.....	39	15	40	SW.	.....do.....	1902	10	...do.....	May 4	.....	Apr. 23	.....	.....	.....	July 7	.....
67	Maryland.....	39	20	50	E.	.....do.....	1903	25	Apr. 9	Apr. 13	Apr. 6	Apr. 6	.....	July 10	Oct. 26	July 20	.....
65	.....do.....	39	20	75	.....	.....do.....	1902	7	Apr. 22	Apr. 25	.....	Mar. 27	.....	July 14	.....	July 14	July 28.
65	.....do.....	39	20	75	.....	.....do.....	1903	.....	Apr. 15	.....	.....	Apr. 1	.....	.....	.....	.....	.....
60	.....do.....	39	35	75	SSW.	Heavy loam.....	1902	25	Apr. 28	May 2	May 28	Apr. 26	July 5	July 12	Nov. 15	July 10	.....
60	.....do.....	39	35	75	SSW.	.....do.....	1903	26	Apr. 24	Apr. 29	Apr. 20	Apr. 2	.....	.....	Nov. –	.....	.....
60	.....do.....	39	35	75	SSW.	.....do.....	1904	27	May 5	May 9	May 11	Apr. 30	June 29	July 30	Sept. 17	.....	Aug. 8.
79	New Jersey.....	39	35	90	NNW.	Gravelly loam.....	1902	50	Apr. 20	Apr. 25	Apr. 15	Apr. 16	.....	July 12	Oct. 22	July 12	.....
89	.....do.....	39	40	150	None.	.....do.....	1904	27	May 5	May 8	Apr. 17	Apr. 30	June 15	July 15	Sept. 25	July 15	.....
91	.....do.....	39	50	.....	.....	.....	1906	35	Apr. 26	Apr. 28	.....	Apr. 14	July 20	July 20	.....	July 10	Aug. 10.
82	.....do.....	39	55	50	W.	Sandy loam.....	1902	20	Apr. 20	Apr. 26	.....	.....	.....	July 8	.....	July 8	July 18.
96	.....do.....	40	15	90	N. & S.	Clay loam.....	1904	37	May 7	May 12	.....	May 5	.....	July 13	Sept. 17	July 13	.....
96	.....do.....	40	15	90	N. & S.	.....do.....	1905	38	Apr. 30	May 4	.....	Apr. 14	.....	July 11	Oct. 18	July 11	.....
96	.....do.....	40	15	90	N. & S.	.....do.....	1906	39	...do.....	May 2	Apr. –	Apr. 20	.....	July 10	Oct. –	July 15	.....
94	.....do.....	40	20	140	SW.	Sandy loam.....	1905	41	Apr. 29	May 4	Apr. 19	.....	.....	July 10	.....	July 10	July 30.
99	.....do.....	40	35	40	NW.	.....do.....	1907	12	May 9	May 12	May 12	May 1	.....	.....	Oct. 5	.....	.....

RED JUNE.

6	North Carolina.....	35	5	200	None.	Sandy.....	1902	.....	Apr. 8	Apr. 16	.....	Apr. 22	.....	.....	.....	.....	.....
6	.....do.....	35	5	200	None.	.....do.....	1904	.....	Mar. 31	Apr. 6	.....	.....	.....	.....	.....	.....	.....
11	.....do.....	35	25	1,990	SE.	Porous loam.....	1904	20	Apr. 15	Apr. 20	Apr. 21	Apr. 30	.....	July 1	Oct. 24	July 20	Aug. 10.
11	.....do.....	35	25	1,990	SE.	.....do.....	1906	22	Apr. 8	Apr. 16	May 10	Apr. 5	.....	.....	Oct. 10	.....	.....
12	.....do.....	35	25	2,130	W.	.....do.....	1902	25	Apr. 18	Apr. 26	Apr. 5	Apr. 14	July 1	July 1	Oct. 15	June 28	Aug. 25.
10	.....do.....	35	30	2,875	SW.	Clay loam.....	1903	12	Mar. 27	Apr. 10	Apr. 28	Apr. 2	July 10	July 25	Oct. 25	.....	.....
2	.....do.....	35	30	2,900	E.	.....do.....	1904	8	Apr. 16	Apr. 28	Apr. 20	Apr. 5	.....	July 10	Oct. 14	.....	.....
2	.....do.....	35	30	2,900	E.	.....do.....	1905	9	Apr. 2	Apr. 13	Apr. 18	Apr. 3	June 20	July 1	Oct. 17	.....	.....
4	.....do.....	35	50	1,200	S.	Sandy loam.....	1904	20	Apr. 15	May 1	.....	May 15	.....	June 20	.....	.....	.....
16	.....do.....	36	10	3,250	S.	Clay loam.....	1904	8	May 10	May 17	Apr. 21	Apr. 20	June 25	July 20	Oct. 15	July 20	Aug. 1.
16	.....do.....	36	10	3,250	S.	.....do.....	1905	9	Apr. 21	May 1	May 16	Apr. 15	July 23	...do.....	Oct. 20	...do.....	Do.
33	Virginia.....	37	0	5	None.	Sandy loam.....	1904	8	Apr. 19	Apr. 25	Apr. 20	Mar. 28	July 9	July 18	Oct. 17	July 18	July 24.
38	.....do.....	37	15	2,170	NW.	Limestone clay.....	1903	14	Apr. 15	Apr. 20	Apr. 5	Mar. 29	.....	.....	Sept. 14	July –	Aug.
30	.....do.....	37	20	950	SE.	Porous loam.....	1902	27	Apr. 10	Apr. 25	Apr. 12	.....	.....	July 5	Oct. 27	.....	.....
78	Delaware.....	38	45	50	None.	Sandy loam.....	1904	21	Apr. 24	May 3	Apr. 22	Apr. 13	.....	.....	.....	.....	.....

TABLE IV.—*Phenological records—Apples*—Continued.

ROME BEAUTY.

Observer's number.	State.	Approximate latitude.	Elevation (feet).	Slope.	Soil.	Year.	Age of tree (yrs.).	Date first bloom.	Date full bloom.	Date last spring frost.	Date leaf buds begin to open.	Date terminal buds begin to form.	Date picked (first picking).	Date first fall frost.	Date fit for use.	Keeps until—
		° ′														
16	North Carolina	36 10	3,250	S.	Clay loam	1904	10	May 12	May 22	Apr. 21	Apr. 25	July 18	Oct. 10	Oct. 15	Nov. 25	May.
16	do	36 10	3,250	S.	do	1905	11	May 5	May 10	May 16	Apr. 20	July 21	do	Oct. 20	do	Do.
38	Virginia	37 15	2,170	NW.	Limestone clay	1902	13	Apr. 28	May 3	Apr. 18	do			Sept. 14		
44	do	37 45	630	SW.	Loam	1904	12	Apr. 26		Apr. –	Apr. 6	June 15				
54	do	39 0	1,000	NE.	Sandy loam	1902	14	Apr. 25	Apr. 30	Apr. 14	Apr. 18	do	Sept 15		Sept. 25	Late.
54	do	39 0	1,000	NE.	do	1903	15	Apr. 13	Apr. 27	Apr. 5	Apr. 2	June 10	Sept. 25		Oct. 15	Jan.
54	do	39 0	1,000	NE.	do	1904	16	May 4	May 10	Apr. 20	Apr. 29	do				
54	do	39 0	1,000	NE.	do	1905	17	Apr. 21	Apr. 27	Apr. 19	Apr. 6	do	Sept. 20			Late.
54	do	39 0	1,000	NE.	do	1906	18	Apr. 27	May 2	May 8	Apr. 16	do	Sept. 25		Oct. 1	Apr.
54	do	39 0	1,000	NE.	do	1907	19	Apr. 26	Apr. 30	Apr. 23	Apr. 4	June 15	Sept. 15		do	Do.
37	do	39 10	600	NW.	Clay loam	1903	17	Apr. 18	Apr. 23							
98	New Jersey	40 30	600	S.	Red shale	1905	14		May 11	Apr. 16	Apr. 28		Sept. —	Oct. —		Feb.

ROXBURY. Synonym: *Roxbury Russet.*

38	Virginia	37 15	2,170	NW.	Limestone clay	1902	13	Apr. 29	May 4	Apr. 18	Apr. 10			Sept. 14		
38	do	37 15	2,170	NW.	do	1903	14	Apr. 15	Apr. 28	Apr. 5	Mar. 27		Sept. 25	do	Oct. 15	Dec.
38	do	37 15	2,170	NW.	do	1904	15	May 5	May 12	May 16	Apr. 22	June 22		Oct. 15		
36	do	38 15	650		Sandy loam	1902	15	Apr. 20	Apr. 24	May 3	Apr. 23			Oct. 17		
48	do	38 45	375	SE.	Porous loam	1903	25	Apr. 9	Apr. 12	Apr. 5	Apr. 15	July 2	Sept. 15	Oct. 25		Dec.
48	do	38 45	375	SE.	do	1905	27	Apr. 24	Apr. 28	Apr. 19	Apr. 26					
48	do	38 45	375	SE.	do	1906	60	Apr. 27	Apr. 29	May 11	May 3			Oct. 11	Aug. 1	Dec.
48	do	38 45	375	SE.	do	1907		Apr. 28	Apr. 30	Apr. 20			Sept. 20	Oct. 13		Jan.
58	Maryland	39 35	300	S.	Limestone loam	1906	50	Apr. 30	May 4	May 10	Apr. 20		Oct. 1	Oct. 12	Oct. 1	Feb.
58	do	39 35	300	S.	do	1907	51	May 3	May 10	May 12	Apr. 23		Oct. 5	Oct. 15	do	Do.
60	do	39 35	75	SW.	Heavy loam	1902	25	Apr. 27	May 1	May 28	do	July 12	do	Nov. 15	Sept. 1	Late.
60	do	39 35	75	SW.	do	1903	26	Apr. 30	May 2	May 20	Apr. 3			Nov. –		
60	do	39 35	75	SW.	do	1904	27	May 7	May 9	May 11	May 1	June 30		Sept. 17		Late.
92	New Jersey	40 15	200	S.	Loam	1907	36	do	May 13	May 22	Apr. 27	June 18	Oct. 1	Oct. –	Jan.	Mar.
104	do	41 0	600	None.	Clay loam	1904	12	May 10	May 16	Apr. 23	May 4	July 2	Oct. 18	Sept. 22	Mar.	Apr.
104	do	41 0	600	None.	do	1905	14	May 6	May 10	Apr. 24	Apr. 27	July 3	Oct. 5	Oct. 22	Dec.	Do.
104	do	41 0	600	None.	do	1906	15			May 11	Apr. 26	June 28		Oct. 12		
104	do	41 0	600	None.	do	1907	16	May 14	May 18	May 12	Apr. 29	July 3	Oct. 18	Oct. 25	Dec.	Apr.

SHOCKLEY.

6	North Carolina	35	5	200	None.	Sandy loam	1902		Apr. 8	Apr. 20		Mar. 25						
6	do	35	5	200	None.	do	1904		Apr. 1	Apr. 7								
15	do	35	15	1,700	SE.	Porous loam	1903	8	do	do	Feb. –					Dec. –		
11	do	35	25	1,990	SE.	do	1904	15	Apr. 28	May 4	Apr. 21	May 10		Oct. 20	Oct. 24			
11	do	35	25	1,990	SE.	do	1905	12	May 1	May 8	May 6	do		Sept. 5	Oct. 18	Dec.	Mar.	
11	do	35	25	1,990	SE.	do	1906	15	Apr. 15	Apr. 22	Mar. 10	Apr. 8		Oct. 10		Nov.	Jan.	
11	do	35	25	1,990	SE.	do	1907	16	Apr. 10	May 1	Apr. 20	Apr. 20			Oct. 13		Feb.	
13	do	35	25	2,180	NE.	do	1904	15	May 1	May 10	Apr. 17	Apr. 25	May 30	Oct. –	Oct. 15	Oct. –	Mar.	
10*d*	do	35	30	4,500	SE.	Sandy loam	1903	12	May 2	May 8	Apr. 28	May 8	July 20	Oct. 1	Oct. 5	Oct. 19	Jan.	
38	Virginia	37	15	2,170	NW.	Limestone clay	1902	13	Apr. 30	May 3	Apr. 18	Apr. 10			Sept. 14			
38	do	37	15	2,170	NW.	do	1903	14	Apr. 15	Apr. 27	Apr. 5	Apr. 5		Sept. 30	do			
38	do	37	15	2,170	NW.	do	1904	15	May 6	May 10	May 16	Apr. 16	June 24		Oct. 15			
28	do	37	20	1,000	N.	Porous loam	1904	12	May 15	May 25	May 7	Apr. 17		Oct. 20		Oct. 20		
28	do	37	20	1,000	N.	do	1906	14	Apr. 17	Apr. 18	Mar. 29	Apr. 3	July 6		Nov. 20			
29	do	37	20	1,000		do	1903	4	Apr. 4	Apr. 10	Apr. 6	Apr. 18		Oct. 1		Dec.	Mar.	
20	do	38	0	700	S.	Clay loam	1905	30	Apr. 10	Apr. 14	Apr. 18	May 28						

SMITH CIDER.

33	Virginia	37	0	5	SW.	Sandy loam	1904	8	Apr. 19	Apr. 26	Apr. 20	Apr. 1	Aug. 12	Aug. 28	Oct. 17			
38	do	37	15	2,170	NW.	Limestone clay	1902	13	Apr. 28	May 2	Apr. 18	Apr. 11		Sept. 15	Sept. 14			
38	do	37	15	2,170	NW.	do	1903	14	Apr. 15	Apr. 20	Apr. 5	Mar. 28		Sept. 25	do	Oct.		
38	do	37	15	2,170	NW.	do	1904	15	May 1	May 8	May 16	Apr. 21	June 20		Oct. 15			
37	do	39	10	600	NW.	Clay loam	1903	17	Apr. 13	Apr. 21								
68	Maryland	39	10	550	S.	do	1906	9	Apr. 21	May 1	May 10	Apr. 18		Oct. 1	Oct. 12	Nov. 15	Jan.	
65	do	39	20	75		Gravelly loam	1902	9	Apr. 23	Apr. 25		Mar. 29		Oct. 6		Oct. 6	Nov.	
65	do	39	20	75		do	1903	10	Apr. 15			Mar. 28				Oct. 1	Dec.	
64	do	39	25	225	SE.	Stony loam	1905	25	Apr. 25	Apr. 30	Apr. 19	Apr. 22	Sept. 15	Sept. 1	Oct. 19	Sept. 20	Do.	
64	do	39	25	225	SE.	do	1906	26	Apr. 30	May 3	May 10	May 3	Sept. 1		Oct. 11			
64	do	39	25	225	SE.	do	1907	29	Apr. 25	May 7	May 5	Apr. 25			Oct. 17			
60	do	39	35	75	SW.	Heavy loam	1902	11	Apr. 27	May 2	May 28	Apr. 23	July 8	Oct. 5				
60	do	39	35	75	SW.	do	1903	26	Apr. 29	do	Apr. 20	Apr. 5						
60	do	39	35	75	SW.	do	1904	27	May 8	May 12	May 11	Apr. 29	June 30	Oct. 10				
79	New Jersey	39	35	90	NW.	Gravelly loam	1902	50	Apr. 21	Apr. 26	Apr. 15	Apr. 18		Sept. 15				
89	do	39	40	150	None.	Porous loam	1904	25	May 5	May 10	Apr. 17	May 1	June 15	Sept. 26	Sept. 25	Feb.[a]		
59	Maryland	39	40	300		Clay loam	1902	20	Apr. 26	Apr. 28	Apr. 15							
82	New Jersey	39	55	50	W.	Sandy loam	1902	20	Apr. 24	Apr. 29				Sept. 20		Sept. 20	Jan.	
86	do	40	0	50	NW.	Loam	1905	20	May 1	May 7		May 10	July 1	Nov. –	Nov. 1	Nov. 1	Late.	
85	do	40	0	75	S.	Sandy loam	1907	50	May 5	May 10	May 12			Oct. 9	Oct. 19		Do.	
96	do	40	15	90	N.&S.	Clay loam	1904	25	May 9	May 14		May 7		Oct. 15	Sept. 17	Oct. 15	Jan.	
96	do	40	15	90	N.&S.	do	1905	26	May 1	May 6		Apr. 15		Oct. 13	Oct. 18	Jan.	Feb.	
96	do	40	15	90	N.&S.	do	1906	27	do		Apr. –	Apr. 21		Oct. 18	Oct. –	Nov. 1	Do.	
92	do	40	15	200	SE.	do	1906	35	Apr. 26	May 4	May 10			Oct. 15	Oct. –	Oct.	Apr.	
92	do	40	15	200	SE.	do	1907	36	May 7	May 12	May 22	Apr. 27	June 15	Oct. 1	Oct. 15	Nov.	Do.	
94	do	40	20	140	S.	Sandy loam	1902	38	Apr. 24	Apr. 29	Apr. 28	Apr. 20	June 27	do	Oct. 10	do	Dec.	
94	do	40	20	140	S.	do	1903	39	Apr. 26	May 1	May –	Apr. 9	June 13	do	Oct. –	Sept.	Feb.	

[a] From cold storage.

TABLE IV.—*Phenological records—Apples*—Continued.

SMITH CIDER—Continued.

194 Observer's number.	State.	Approximate latitude.	Elevation (feet).	Slope.	Soil.	Year.	Age of tree (yrs.).	Date first bloom.	Date full bloom.	Date last spring frost.	Date leaf buds begin to open.	Date terminal buds begin to form.	Date picked (first picking).	Date first fall frost.	Date fit for use.	Keeps until—
		° ′														
94	New Jersey	40 20	140	S.	Sandy loam	1904	40	May 6	May 11	.....	Apr. 25	July 16	...do.....	Sept. 20	Oct.	Mar.
94	.....do.....	40 20	140	S.	.....do.....	1905	41	May 1	May 5	Apr. 19	.....	.....	Oct. –	.....	...do.....	Do.
94	.....do.....	40 20	140	S.	.....do.....	1906	42	May 2	May 9	May –	Apr. 20	June 5	...do.....	Oct. –	...do.....	Jan.
94	.....do.....	40 20	140	S.	.....do.....	1907	43	May 8	May 12	.....	May 22	July 3	...do.....	Oct. 20	...do.....	Feb.
98	.....do.....	40 30	600	S.	Red shale	1905	14	May 3	May 9	Apr. 16	Apr. 23	.....	Oct. 1	Oct. –	.....	Mar.
100	.....do.....	40 35	600	N.	Clay loam	1903	19	Apr. 22	Apr. 27	.....	.....	.....	.....	.....	.....	.....
100	.....do.....	40 35	600	N.	.....do.....	1904	20	May 8	May 14	Apr. 22	Apr. 27	.....	.....	.....	.....	.....
104	.....do.....	41 0	600	None.	.....do.....	1904	12	May 10	...do.....	Apr. 23	May 2	July 7	Oct. 20	Sept. 22	Feb.	Apr.
104	.....do.....	41 0	600	None.	.....do.....	1906	15	May 9	...do.....	May 11	Apr. 22	July 4	...do.....	Oct. 12	...do.....	Do.
104	.....do.....	41 0	600	None.	.....do.....	1907	16	May 15	May 20	May 12	Apr. 27	July 1	Oct. 26	Oct. 25	Dec.	May.

SMOKEHOUSE.

38	Virginia	37 15	2,170	NW.	Limestone clay	1902	13	Apr. 24	May 2	Apr. 18	Apr. 13	.....	.....	Sept. 14	.....	.....
52	.....do.....	37 20	1,200	W.	Porous loam	1902	25	Apr. 16	Apr. 24	.....	Apr. 4	.....	.....	.....	.....	.....
31	.....do.....	37 25	1,400	NW.	Gravelly loam	1902	6	Apr. 20	...do.....	Apr. 8	Apr. 21	July –	Sept. 25	.....	Oct. 25	Dec.
50	.....do.....	37 55	200	E.&W.	Sandy loam	1903	16	Mar. 30	Apr. 4	.....	Apr. 5	.....	Aug. 20	.....	Aug. 20	Sept.
35	.....do.....	38 30	400	NE.	Red clay	1902	15	Apr. 23	Apr. 25	Apr. 15	Apr. 4	Aug. 20	July 26	Oct. 22	July 19	Do.
35	.....do.....	38 30	400	NE.	.....do.....	1903	16	Apr. 1	Apr. 10	Apr. 5	Mar. 22	Aug. 7	.....	Oct. 18	July 11	Dec.
35	.....do.....	38 30	400	NE.	.....do.....	1904	17	Apr. 27	May 2	Apr. 23	Apr. 5	Aug. 2	.....	Sept. 23	Aug. 1	Sept.
35	.....do.....	38 30	400	NE.	.....do.....	1905	18	Apr. 12	Apr. 19	Apr. 20	Mar. 28	July 17	Aug. 10	Oct. 13	July 15	Do.
35	.....do.....	38 30	400	NE.	.....do.....	1906	19	Apr. 19	Apr. 25	May 10	Apr. 9	July 29	.....	Oct. 11	July 22	Do.
48	.....do.....	38 45	375	S.	Porous loam	1906	30	Apr. 27	Apr. 29	May 11	Apr. 30	.....	.....	...do.....	July 25	Do.
55	.....do.....	39 0	600	E.	.....do.....	1907	14	Apr. 20	May 1	May 9	Mar. 26	.....	Sept. 1	Oct. 10	Oct.	Dec.
37	.....do.....	39 10	600	NW.	Clay loam	1903	17	Apr. 14	Apr. 20	.....	.....	.....	.....	.....	.....	.....
60	Maryland	39 35	75	SW.	Heavy loam	1902	25	Apr. 27	May 2	May 28	Apr. 22	July 10	Sept. 16	Nov. 15	July 15	.....
60	.....do.....	39 35	75	SW.	.....do.....	1903	26	Apr. 25	Apr. 28	Apr. 20	Apr. 3	.....	.....	Nov. –	.....	.....
60	.....do.....	39 35	75	SW.	.....do.....	1904	27	May 9	May 10	May 11	Apr. 29	June 30	.....	Sept. 17	.....	.....
60*a*	.....do.....	39 35	125	SW.	Sandy loam	1902	35	Apr. 26	Apr. 28	Apr. 20	Apr. 20	July 10	Aug. 25	Nov. 15	July 1	Dec.
60*a*	.....do.....	39 35	125	SW.	.....do.....	1903	36	Apr. 15	Apr. 23	...do.....	Apr. 1	.....	Oct. 3	Nov. –	.....	Do.
60*a*	.....do.....	39 35	125	SW.	.....do.....	1904	37	Apr. 30	May 7	Apr. 21	Apr. 22	July 5	Sept. 20	Sept. 17	.....	Do.
85	.....do.....	40 0	75	None.	.....do.....	1907	50	May 1	May 6	May 12	.....	.....	Oct. 9	Oct. 19	Sept. 5	Oct.
82	New Jersey	39 55	50	W.	.....do.....	1902	6	Apr. 23	Apr. 29	.....	.....	.....	Sept. 1	.....	Sept. 1	Do.
82	.....do.....	39 55	50	W.	.....do.....	1903	7	Apr. 16	.....	.....	.....	.....	.....	.....	.....	.....
84	.....do.....	39 55	50	N.	Heavy loam	1902	35	Apr. 25	Apr. 30	Apr. 16	Apr. 18	Aug. 15	Sept. 1	Oct. 10	Sept. 10	Jan.
84	.....do.....	39 55	50	N.	.....do.....	1903	36	Apr. 20	Apr. 25	May 2	Apr. 5	Aug. 1	...do.....	Oct. –	Sept. 1	Do.
86	.....do.....	40 0	50	NW.	Loam	1905	20	May 1	May 6	.....	May 10	July 1	Sept. 15	Nov. –	Sept. 15	Nov.

STAYMAN WINESAP.

48	Virginia	38	45	350	SE.	Porous loam	1907		Apr. 26	Apr. 28	Apr. 20				Oct. 13		
75	Delaware	39	0	60	None.	Sandy loam	1906	10	Apr. 22	do	Apr. 3	Apr. 18		Oct. 1	Oct. –	Nov.	Jan.
72	do	39	10	70	None.	do	1902	10	Apr. 23	Apr. 26				Oct. 10	Oct. 10	Nov. 1	
68	Maryland	39	10	550	S.	Porous loam	1906	9	Apr. 19	May 1	May 10	Apr. 15		Oct. 1	Oct. 12	Nov. 15	May.
65	do	39	20	75		Gravelly loam	1902	7	Apr. 23	Apr. 28		Mar. 9		Oct. 13		Oct. 6	Jan.
65	do	39	20	75		do	1903	8	Apr. 15	Apr. 22		May 28				Nov. 15	Feb.
82	New Jersey	39	55	50	W.	Sandy loam	1902	6	Apr. 24	Apr. 30				Sept. 25		Sept. 25	Jan.

SUMMER HAGLOE. Synonym: *Hagloe.*

72	Delaware	39	10	70	None.	Sandy loam	1902	10	Apr. 26	Apr. 29				Aug. 1	Oct. 20	Aug. 10	
89	New Jersey	39	40	150	None.	Gravelly loam	1904	25	May 8	May 12	Apr. 17	May 5	June 15	do	Sept. 25	Aug. 1	
82	do	39	55	50	W.	Sandy loam	1902	19	Apr. 24	Apr. 29				July 17		July 17	Aug.
82	do	39	55	50	W.	do	1903	20	Apr. 21								
80	do	40	5	60	N.	Gravelly loam	1904	40	May 6	May 19	Apr. 24		June 1	Aug. 25	Oct. 10	Aug. 10	

TETOFSKI.

38	Virginia	37	15	2,170	NW.	Limestone clay	1903	14	Apr. 13	Apr. 26	Apr. 15	Apr. 11			Sept. 14		
38	do	37	15	2,170	NW.	do	1904	15	May 6	May 13	May 16	Apr. 22	July 2		Oct. 15		
100	New Jersey	40	35	600	N.	Clay loam	1903	19	Apr. 25			Apr. 1					
100	do	40	35	600	N.	do	1904	20	May 3	May 12	Apr. 22	Apr. 27		Aug. 9		Aug. 10	Aug. 15.

TOMPKINS KING. Synonym: *King.*

38	Virginia	37	15	2,170	NW.	Limestone clay	1903	14	Apr. 14	Apr. 20	Apr. 5	Apr. 17		Sept. 20	Sept. 14		
38	do	37	15	2,170	NW.	do	1904	15	May 8	May 12	May 16	Apr. 19	June 25		Oct. 15		
48	do	38	45	375	S.	Porous loam	1906	30	Apr. 26	Apr. 28	May 11	May 1			Oct. 11		Oct.
54	do	39	0	1,000	NE.	do	1902	8	Apr. 24	do	Apr. 14	Apr. 14	June 20	Sept. 20		Nov. 1	
104	New Jersey	41	0	600	None.	Clay loam	1904	12	May 10	May 14	Apr. 23	May 3	July 2	Sept. 30	Sept. 22	do	Jan.
104	do	41	0	600	None.	do	1906	15	May 8	May 13	May 11	Apr. 22	June 30	Oct. 1	Oct. 12	Feb.	Apr.
104	do	41	0	600	None.	do	1907	16	May 14	May 20	May 12	Apr. 26	July 7	do	Oct. 25	Nov.	Feb.
101	do	41	10	550	SE.	Gravelly loam	1904	18	May 8	May 15	Apr. 23	Apr. 24			Sept. 22		
102	do	41	10	800	None.	Sandy loam	1904	23	May 10	do							
102	do	41	10	800	None.	do	1905	24	May 7	May 11		Apr. 18					

TABLE IV.—*Phenological records—Apples*—Continued.

VIRGINIA BEAUTY.

Observer's number.	State.	Approximate latitude.	Elevation (feet).	Slope.	Soil.	Year.	Age of tree (yrs.).	Date first bloom.	Date full bloom.	Date last spring frost.	Date leaf buds begin to open.	Date terminal buds begin to form.	Date picked (first picking).	Date first fall frost.	Date fit for use.	Keeps until—
		° ′														
10	North Carolina	35 30	2,875	S.	Clay loam	1902	12	Apr. 28	May 8	Apr. 1	May 4	July 30	Oct. 20	Oct. 15	Dec. 1	Feb.
10c	do	35 30	4,000	NE.	do	1902	6	do	May 6	Apr. 25	May 7	July 24	Oct. 10	Oct. 3	Nov. 25	Dec.
10d	do	35 30	4,500	SE.	Sandy loam	1902	12	May 1	do	Apr. 22		July 27	Oct. 21	Oct. 1	Dec. 1	Jan.
4	do	35 50	1,200	S.	do	1904	12	Apr. 15	May 1		May 15		Oct. –		Sept. –	
16	do	36 10	3,250	S.	Clay loam	1904	10	May 8	May 15	Apr. 21	Apr. 24	July 29	Oct. 5	Oct. 15	Nov. 1	Feb.

WEALTHY.

38	Virginia	37 15	2,170	NW.	Limestone clay	1903	14	Apr. 15	Apr. 27	Apr. 5	Mar. 30		Sept. 20	Sept. 14	Oct. 5	
38	do	37 15	2,170	NW.	do	1904	15	May 6	May 13	May 16	Apr. 21	June 27		Oct. 15		
72	Delaware	39 10	70	None.	Sandy loam	1902	7	Apr. 25	Apr. 28				Sept. 5	Oct. 20		
82	New Jersey	39 55	50	W.	do	1902	6	Apr. 24	Apr. 27				Aug. 15		Aug. 15	Sept. 15.

WILLIAMS.

38	Virginia	37 15	2,170	NW.	Limestone clay	1903	14	Apr. 16	Apr. 29	Apr. 5	Mar. 30			Sept. 14		
38	do	37 15	2,170	NW.	do	1904	15	May 7	May 14	May 16	Apr. 26	June 28		Oct. 15		
76	Delaware	39 5	40	NE.	Sandy loam	1903	12	Apr. 20	Apr. 28	Apr. 6	Apr. 1	June 16	July 13			July. 27.
76	do	39 5	40	NE.	do	1904	13	May 5	May 7	Apr. 21	Apr. 28	June 23	July 23	Oct. 28	July 28	
76	do	39 5	40	NE.	do	1905	14	Apr. 26	Apr. 29	Apr. 19	Apr. 4	June 14	July 24	Oct. 22		
72	do	39 10	70	None.	do	1902	7	Apr. 25	Apr. 28				July 10	Oct. 20	July 10	
82	New Jersey	39 55	50	W.	do	1902	6	Apr. 24	Apr. 30				July 15		July 11	Aug. 1.
86	do	40 0	50	NW.	Loam	1905	20	May 1	May 7			July 1	July 25	Nov. –	July 15	Do.
80	do	40 5	60	N.	Gravelly loam	1904	24	May 7		Apr. 24		June 1	July 15	Oct. 10	do	
80	do	40 5	60	N.	do	1905	25	May 1	May 5	Apr. 19	Apr. 21	June 15	July 25	Oct. 15	July 25	
80	do	40 5	60	N.	do	1906	26	Apr. 29	do	Apr. 6		June 14	Aug. 1		July 14	
80	do	40 5	60	N.	do	1907	30	May 10	May 20	Apr. 20	Apr. 27	July 1	July 25			
99	do	40 35	40	NW.	Sandy loam	1907	25	do	May 14	May 12	May 3	Sept. 15	July 30	Oct. 5	July –	Aug.

15	North Carolina	35	15	1,700	SE.	Porous loam	1903	8	Apr. 3	Apr. 11	Feb. –				Dec. –			
7	do	35	20	700	None.	Loam	1905	10	Mar. 25	Apr. 5	Apr. 17	Mar. 18			Oct. 11			
11	do	35	25	1,990	SE.	Porous loam	1904	20	Apr. 28	May 3	Apr. 21	May 8		Oct. 10	Oct. 24	Nov. 1	Dec.	
11	do	35	25	1,990	SE.	do	1906	22	Apr. 10	Apr. 18	May 10	Apr. 5		do	Oct. 10	do	Jan.	
11	do	35	25	1,990	SE.	do	1907	15	do	May 1	Apr. 20	Apr. 15			Oct. 13		Dec.	
12	do	35	25	2,130	W.	do	1902	17	Apr. 24	do	Apr. 5	Apr. 22	July 4	Sept. 30	Oct. 15	Oct. 15	May.	
12	do	35	25	2,130	W.	do	1903	18	Apr. 8	Apr. 13	Apr. 6	Apr. 13	July 6					
12	do	35	25	2,130	W.	do	1904	19	Apr. 17	Apr. 28	Apr. 11	Apr. 27		Oct. 1	Oct. 15	Dec. 20	Apr.	
12	do	35	25	2,130	W.	do	1905	20	Apr. 6	Apr. 14	Apr. 7	Apr. 20	July 24	do	Oct. 14	Dec. –	Do.	
13	do	35	25	2,180	NE.	Porous clay	1904	15	May 1	May 10	Apr. 17	Apr. 25	May 30	Oct. –	Oct. 15	Sept. 15	Mar.	
2	do	35	30	2,900	E.	Clay loam	1904	8	Apr. 17	Apr. 28		Apr. 7		Nov. 12	Oct. 14			
2	do	35	30	2,900	E.	do	1905	9	Apr. 5	Apr. 13	Apr. 18	Apr. 3	July 24		Oct. 17			
10	do	35	30	2,875	SW.	do	1902	12	Apr. 30	May 10	Apr. 1	May 5	July 31	Oct. 15	Oct. 15	Dec. 25	Feb.	
10	do	35	30	2,875	SW.	do	1903	7	Apr. 4	Apr. 14	Apr. 28	Apr. 1	July 12	do	Oct. 25	Dec. 10	Do.	
10	do	35	30	2,875	SW.	do	1904	8	Apr. 15	Apr. 25	Apr. 1	Mar. 23	June 30	Oct. 20	Oct. 16	Nov. 1	Do.	
10	do	35	30	2,875	SW.	do	1905	9			Mar. 10	Mar. 28	July 2	do		Dec. 10		
10	do	35	30	2,875	SW.	do	1906	10	Mar. 28	Apr. 10	Apr. 15	do	July 15	Nov. 15	Oct. 14	Dec. –	Mar.	
10*a*	do	35	30	3,300	NE.	do	1902	6	Apr. 21	Apr. 27	do	Apr. 21	July 31	Oct. 20	Oct. 5	Nov. 20	Jan.	
10*b*	do	35	30	3,500	SE.	Gravelly clay	1902	12	Apr. 29	May 8	Apr. 20	May 7	July 30	do	Oct. 3	Dec. 20	Mar.	
10*c*	do	35	30	4,000	NE.	Clay loam	1902	6	May 1	do	Apr. 25	May 9	July 26	Oct. 15	do	Dec. 1	Feb.	
10*d*	do	35	30	4,500	SE.	Sandy loam	1902	13	Apr. 25	May 3	Apr. 22	May 8	July 30	Oct. 20	Oct. 1	Nov. 20	Jan.	
10*d*	do	35	30	4,500	SE.	do	1903	14	May 3	May 10	Apr. 28	May 9	July 18	do	Oct. 5	Dec. 1	May.	
1	do	35	35	2,300	S.	Loam	1904	12	Apr. 15	Apr. 28		Apr. 3			Oct. 15			
1	do	35	35	2,300	S.	do	1905	13	Apr. 5	Apr. 15	Apr. 16	Mar. 27		Oct. 15	Oct. 16	Jan. 1		
4	do	35	50	1,200	S.	Sandy loam	1904	20	Apr. 15	May 1		May 15						
5	do	35	50	1,500	N.	Loam	1905	20	do	Apr. 20	Mar. 30	Mar. 25	May 5	Oct. 25	Oct. –	Oct. 10	Apr.	
8	do	36	5	900	S.	Sandy	1905	15	Apr. 3	do								
47	Virginia	36	45	1,700	SE.	Black loam	1905		Apr. 15	May 1	May 1			Sept. 25		Nov. 1	Apr.	
33	do	37	5	5	SW.	Sandy loam	1903	7			Apr. 5	Mar. 25	Aug. 20		Oct. 27			
33	do	37	5	5	SW.	do	1904	8	Apr. 24	Apr. 29	Apr. 20	Apr. 4	June 23	Aug. 15	Oct. 17			
48	do	37	5				1907	21	Apr. 29	May 8	do	Apr. 30		Sept. 28	Oct. 15	Sept. 15	Mar.	
40	do	37	10	2,400	None.	Porous loam	1907	8	Apr. 10	Apr. 26	Apr. 5							
39	do	37	10	2,000	NW.	Dark loam	1902	8	Apr. 25	May 3	May 18			Oct. 20	Sept. 10	Jan. 10	Apr.	
26	do	37	15	900	N.	Sandy loam	1902	15	Apr. 21	Apr. 26			June 20			Jan. 25		
26	do	37	15	900	N.	do	1903	16	Apr. 4	Apr. 12								
46	do	37	15	500	S.	do	1903	16	Apr. 1							Sept. 20	Mar.	
38	do	37	15	2,170	NW.	Limestone clay	1902	13	Apr. 28	May 3	Apr. 18	Apr. 12		Sept. 25	Sept. 14			
38	do	37	15	2,170	NW.	do	1903	14	Apr. 30	May 15	Apr. 5	Apr. 5		Sept. 30	do			
38	do	37	15	2,170	NW.	do	1904	15	May 7	May 12	May 16	Apr. 23	June 24		Oct. 15			
28	do	37	20	1,000	N.	Porous loam	1904	5	May 15	May 25	May 7			Oct. 20		Oct. 20	Late.	
28	do	37	20	1,000	N.	do	1905	10	Apr. 6	Apr. 20	Mar. 28	Apr. 3	June 19	Sept. 24	Oct. 13	do	Do.	
28	do	37	20	1,000	N.	do	1906	11	Apr. 12	Apr. 21	May 29	Apr. 10	July 10		Nov. 20			
28	do	37	20	1,000	N.	do	1907	12	Apr. 4	Apr. 27	May 7	Mar. 27	June 18	Oct. 8	Nov. 4	Oct. 25	Late.	
52	do	37	20	1,200	W.	Clay loam	1902	20	Apr. 17	Apr. 25		Apr. 10						
25	do	37	20	1,000	SE.	do	1902	15	Apr. 15	Apr. 20	Mar. 20	Apr. 15	July 15	Oct. 15	Oct. 20	Dec. 1	Apr.	
25	do	37	20	1,000	SE.	do	1903	16	Apr. 20	May 1	Apr. 20	Apr. 20	July 20	Oct. 10	Oct. 15	Nov. 15	Do.	
25	do	37	20	1,000	SE.	do	1904	17	May 1	May 10	May 5	May 1	July 10	do	Oct. 10	do	Do.	
25	do	37	20	1,000	SE.	do	1905	18	Apr. 25	May 5	Apr. 15	Apr. 25	July 20	Oct. 20	Oct. 20	do	Do.	

TABLE IV.—*Phenological records—Apples*—Continued.

WINESAP—Continued.

Observer's number.	State.	Approximate latitude.	Elevation (feet).	Slope.	Soil.	Year.	Age of tree (yrs.).	Date first bloom.	Date full bloom.	Date last spring frost.	Date leaf buds begin to open.	Date terminal buds begin to form.	Date picked (first picking).	Date first fall frost.	Date fit for use.	Keeps until—
		° ′														
29	Virginia	37 20	1,200	SE.	Porous loam	1903	10	Apr. 7	Apr. 16	Apr. 6	Apr. 20		Oct. 1		Oct. –	Feb.
31	do	37 25	1,400	NW.	Gravelly loam	1902	12	Apr. 24	Apr. 26	Apr. 8	Apr. 23	July –	Sept. 28		Nov. 15	Late.
27	do	37 30	1,000	NE.	Clay loam	1902	26	Apr. 19	Apr. 22	Mar. –	Apr. 9		Sept. 25	Nov. –	Nov. –	Feb.
44	do	37 45	630	SW.	Loam	1904	12	Apr. 25		Apr. –	Apr. 4	June 15				
42	do	37 45	800	SE.	Clay loam	1903	2	Apr. 4	Apr. 15	Apr. 15	Apr. 25		Sept. 15		Dec. 15	June.
43	do	37 50	1,000	SE.	do	1903	6	Apr. 5	Apr. 18	Apr. 5	Apr. 20	June 1	Oct. 10	Oct. 27	Oct. –	May.
45	do	37 50	1,000			1906	15	Apr. 16	Apr. 20	May 9	Apr. 10		Oct. 1	Oct. 10	Nov.	Do.
44*a*	do	37 50	1,000			1907	26	Apr. 1	do	Apr. –			do		Dec.	Apr.
21	do	37 55	500	SE.	Clay	1904	20	Apr. 24	Apr. 26		Apr. 10		Sept. 1			
20	do	38 0	700	S.	do	1905	30	Apr. 10	Apr. 14	Apr. 18	Mar. 29					
41	do	38 0	1,200	N.	Clay loam	1903	19	Apr. 5	Apr. 11	Apr. 5	Mar. 25		Oct. 14	Oct. 15	Dec. 15	Apr.
71	Maryland	38 5	20	SE.	Red clay	1902	8		Apr. 27		Apr. 10		Nov. 1		Dec. 1	Feb.
19	Virginia	38 5	900	S.	do	1905	8	Apr. 13	Apr. 23	Apr. 19	Apr. 2		Sept. 19	Oct. 7	Oct. –	
19	do	38 5	900	S.	do	1905	19	Apr. 11	Apr. 22	do	Mar. 29		do	do	do	
18	do	38 10	1,000	W.	Sandy loam	1902	16						Sept. 25	Oct. 5	Nov. 15	Feb.
18	do	38 10	1,000	W.	do	1903	17	Apr. 4	Apr. 13	Apr. 7	Apr. 30		Oct. 1	Oct. 20	Nov. 1	Dec.
22	do	38 10	1,200	NE.	Gravelly loam	1907	20	Apr. 23	Apr. 30	May 22	Mar. 28		Oct. 15	Oct. 9	Feb. –	Apr.
36	do	38 15	650		Sandy loam	1902	15	Apr. 18	Apr. 23	May 3	Apr. 18			Oct. 17		
53	do	38 25	1,400	W.	Gravelly loam	1902	16	Apr. 26	Apr. 30		Apr. 14		Sept. 30		Dec. –	Mar.
53	do	38 25	1,400	W.	do	1903	17	Apr. 12	Apr. 22		Apr. 8		Oct. –		do	Do.
53	do	38 25	1,400	W.	do	1905	19	Apr. 21	Apr. 27	Apr. 24	Apr. 6		Oct. 1		Oct. –	Do.
53	do	38 25	1,400	W.	do	1906	20	Apr. 25	May 2	May 11	Apr. 17		do	Oct. 8	do	Do.
35	do	38 30	400	NE.	Red clay	1902	15	Apr. 23	Apr. 27	Apr. 15	Apr. 16	Aug. 16	Oct. 15	Oct. 22	Oct. 1	Apr.
35	do	38 30	400	NE.	do	1903	16	Apr. 7	Apr. 14	Apr. 5	Mar. 27	Aug. 5	Oct. 1	Oct. 18	Sept. 1	Do.
35	do	38 30	400	NE.	do	1904	17	May 1	May 6	Apr. 23	Apr. 9	Aug. 4	Sept. 26	Sept. 23	do	Do.
35	do	38 30	400	NE.	do	1905	18	Apr. 13	Apr. 21	Apr. 20	Mar. 31	July 18		Oct. 13	do	Do.
35	do	38 30	400	NE.	do	1906	19	Apr. 22	Apr. 29	May 10	Apr. 11	July 29		Oct. 11	do	Do.
61	Maryland	38 40	45	None.	Sandy loam	1907	15	Apr. 15	Apr. 28							
78	Delaware	38 45	50	SE.	do	1904	21	Apr. 29	May 4	Apr. 22	Apr. 13					
34	Virginia	38 45	300	W.	Clay loam	1902	13			May 30			Oct. 18	Sept. 18	Sept. 1	Jan.
48	do	38 45	375	SE.	Porous loam	1903	15	Apr. 10	Apr. 15	Apr. 5	Apr. 18	June 30	Sept. 15	Oct. 25	Jan. –	Mar.
48	do	38 45	375	SE.	do	1906	33	Apr. 27	Apr. 29	May 11	May 2			Oct. 11	Sept. 1	Do.
48	do	38 45	375	SE.	do	1907	34	do	Apr. 30	Apr. 20				Oct. 13		
54	do	39 0	1,000	NE.	do	1902	14	Apr. 24	Apr. 29	Apr. 14	Apr. 17	June 15	Sept. 25		Sept. 1	Late.
54	do	39 0	1,000	NE.	do	1903	15	Apr. 10	Apr. 22	Apr. 5	May 30	June 10	Sept. 30		Dec. 1	Do.
54	do	39 0	1,000	NE.	do	1904	16	May 3	May 9	Apr. 20	Apr. 27	do				

54	do	39	0	1,000	NE.	do	1905	17	Apr. 19	Apr. 26	Apr. 19	Apr. 10	do				
54	do	39	0	1,000	NE.	do	1906	18	Apr. 25	Apr. 30	May 8	Apr. 18	do	Oct. 1		Oct. 1	Apr.
54	do	39	0	1,000	NE.	do	1907	19	Apr. 20	Apr. 26	Apr. 23	Mar. 30	do	do		Dec. 1	June.
55	do	39	0	600	E.	Sandy loam	1907	14	Apr. 21	Apr. 25	May 8	Mar. 29		do	Oct. 10	Jan. –	Mar.
57	Maryland	39	0	75	None.	Sandy	1907	25	Apr. 20	May 6	Apr. 18	Apr. 4					
72	Delaware	39	10	70	None.	Sandy loam	1902	30	Apr. 24	Apr. 26				Oct. 25	Oct. 20	Nov. 15	
73	do	39	10	100	N.	do	1902	20	Apr. 28	May 4		Apr. 10		Nov. 1		Dec. 20	Jan.
74	do	39	10	80	None.	Clay loam	1903	14	Apr. 18	Apr. 25	Apr. 6			Oct. 1	Oct. 22	Dec. –	
37	Virginia	39	10	600	NW.	do	1903	17	Apr. 17	Apr. 23							
87	New Jersey	39	15	40	SW.	Sandy loam	1902	10	Apr. 30	May 7		Apr. 24					
67	Maryland	39	20	50	E.	do	1903	8	Apr. 10	Apr. 15	Apr. 6	Apr. 7		Oct. 15	Oct. 26	Nov. 1	Dec.
64	do	39	25	225	SE.	Stony loam	1905	25	Apr. 28	Apr. 30	Apr. 19	Apr. 26	Sept. 1	do	Oct. 19	Dec. 15	Mar.
64	do	39	25	225	SE.	do	1906	26	Apr. 30	May 3	May 10	May 2	Aug. 15		Oct. 11		
64	do	39	25	225	SE.	do	1907	27	Apr. 28	May 8	May 5	May 1			Oct. 17		
60	do	39	35	75	SW.	Heavy loam	1902	25	do	May 1	May 28	Apr. 23	July 12	Sept. 16	Nov. 15	Sept. 1	Late.
60	do	39	35	75	SW.	do	1903	26	Apr. 30	May 2	Apr. 20	Apr. 3			Nov. –		
60	do	39	35	75	SW.	do	1904	27	May 6	May 9	May 11	May 2	July 4	Oct. 5	Sept. 17		Late.
79	New Jersey	39	35	90	NNW.	Gravelly loam	1902	50	Apr. 24	Apr. 29	Apr. 15	Apr. 21		Sept. 20	Nov. 15	Sept. 10	
89	do	39	40	150	None.	do	1904	10	May 8	May 12	Apr. 17	May 4	June 15	Oct. 1	Sept. 25	Apr. 1[a]	
91	do	39	50				1906	3	Apr. 30	May 1		Apr. 14	July 20	Oct. 15		Oct. 1	Apr.
82	do	39	55	50	W.	Sandy loam	1902	20	Apr. 24	Apr. 28				Sept. 25		Sept. 25	Dec.
94	do	40	20	140	S.	do	1902	38	do	May 1	Apr. 28	Apr. 20	June 27	Oct. 1	Oct. 10	Nov. –	Feb.
94	do	40	20	140	S.	do	1904	40	May 8	May 11		Apr. 30	July 16	do	Sept. 20	Dec. –	Apr.
94	do	40	20	140	S.	do	1905	41	Apr. 30	May 4	Apr. 19			Oct. –		Sept. –	Do.
94	do	40	20	140	S.	do	1906	42	May 3	May 8		Apr. 21	June 5	Oct. 1	Oct. –	Oct. –	June.
94	do	40	20	140	S.	do	1907	43	May 1	May 14		Apr. 26	July 4	Nov. 1	Oct. 20	do	Feb.
99	do	40	35	40	NW.	do	1907	12	May 12		May 12	May 1		Oct. 15	Oct. 5		May.
104	do	41	0	600	None.	Clay loam	1905	16	May 7	May 11	Apr. 24	Apr. 25	July 1	Oct. 17	Oct. 22	Jan. 1	Do.

WINTER PARADISE. Synonym: *Sweet Winter Paradise.*

28	Virginia	37	20	1,000	N.	Clay loam	1904	12	May 12	May 18	May 7			Oct. 20		Sept. 15	
29	do	37	20	1,200	SE.	do	1903	25	Apr. 10	Apr. 15	Apr. 6	Apr. 15		Aug. 20		Oct. –	Dec.
35	do	38	30	400	NE.	Red clay	1902	15	Apr. 20	Apr. 27	Apr. 15	Mar. 31	Aug. 10	Sept. 26	Oct. 22	Sept. 1	Jan.
35	do	38	30	400	NE.	do	1903	16	Mar. 31	Apr. 5	Apr. 5	Mar. 23	Aug. 1	Sept. 15	Oct. 18	Aug. 10	Nov.
35	do	38	30	400	NE.	do	1904	17	Apr. 30	May 5	Apr. 23	Apr. 4	July 27	do	Sept. 23	Sept. 10	Jan.
35	do	38	30	400	NE.	do	1905	18	Apr. 13	Apr. 22	Apr. 20	Mar. 29	July 18		Oct. 13	Sept. 1	
35	do	38	30	400	NE.	do	1906	19	Apr. 20	Apr. 25	May 10	Apr. 11	July 24	Sept. 1	Oct. 11	Aug. 15	Oct.
54	do	39	0	1,000	NE.	Porous loam	1903	20	Apr. 9	Apr. 21	Apr. 5	Mar. 28	June 10	Sept. 25		Oct. 1	Dec.
54	do	39	0	1,000	NE.	do	1905	17	Apr. 18	Apr. 25	Apr. 19	Apr. 6	do	do			

[a] From cold storage.

TABLE IV.—*Phenological records—Apples*—Continued.

YELLOW NEWTOWN. Synonym: *Albemarle Pippin.*

Observer's number.	State.	Approximate latitude.	Elevation (feet).	Slope.	Soil.	Year.	Age of tree (yrs.).	Date first bloom.	Date full bloom.	Date last spring frost.	Date leaf buds begin to open.	Date terminal buds begin to form.	Date picked (first picking).	Date first fall frost.	Date fit for use.	Keeps until—
		° ′														
10	North Carolina	35 30	2,875	SW.	Clay loam	1905	8			Mar. 10	Mar. 28	July 5	Oct. 28		Nov. 20	Jan.
10*d*	do	35 30	4,500	SE.	Sandy loam	1902	12	May 1	May 6	Apr. 22		July 31	Oct. 25	Oct. 1	do	Dec.
47	Virginia	36 45	1,700	SE.	Black loam	1905		Apr. 15	May 1	May 1				do	Dec. 20	Apr.
51	do	37 10	2,900	SE.	Sandy loam	1905	25	May 5		Apr. 16	Apr. 10		Oct. 1	Oct. 20	Nov. 20	Do.
52	do	37 20	1,200	W.	Clay loam	1902	25	Apr. 10	Apr. 25		do					
29	do	37 20	1,200	SE.	do	1903	20	do	Apr. 19	Apr. 6	Apr. 25		Oct. 15		Dec. –	Mar.
44	do	37 45	630	SW.	Loam	1904	15	Apr. 25		Apr. –	Apr. 10	June 15				
42	do	37 45	800	SE.	Red clay	1903	20	Apr. 6	Apr. 15	Apr. 15	Apr. 25		Sept. 15		Jan. –	June.
44*a*	do	37 50	1,200	NW.	Porous loam	1907	26	Apr. 1	Apr. 20	Apr. –			Oct. 1		Dec. –	Apr.
45	do	37 50	1,200			1906	15	Apr. 19	Apr. 21	May 9	Apr. 14			Oct. 10		
41	do	38 0	1,200	N.	Black loam	1903	19			Apr. 5	May 25		Sept. 18	Oct. 15	Mar. –	May.
54	do	39 0	1,000	NE.	Porous loam	1902	6	Apr. 24	Apr. 29	Apr. 14	Apr. 16	June 20				

YELLOW TRANSPARENT.

17	North Carolina	36 15	3,000	SE.	Clay loam	1904	8	Apr. 20	Apr. 25	May 3	Mar. 20		July 20	Oct. 11	June 10	
40	Virginia	37 10	2,400	None.	Porous loam	1907	8	Apr. 15	Apr. 20	Apr. 5						
26	do	37 15	900	NW.	Sandy loam	1902	7	Apr. 21	Apr. 28							
26	do	37 15	900	NW.	do	1903	8	Apr. 6	Apr. 11			June 1	June 10		June 10	July 15.
38	do	37 15	2,170	NW.	Limestone clay	1902	13	Apr. 28	May 2	Apr. 18	Apr. 10			Sept. 14		
38	do	37 15	2,170	NW.	do	1903	14	Apr. 15	Apr. 26	Apr. 5	Apr. 8			do		
28	do	37 20	1,000	N.	Clay loam	1904	8	May 4	May 14	May 7	Apr. 17		July 20		July 20	Aug. 20.
28	do	37 20	1,000	N.	do	1906	10	Apr. 14	Apr. 16	Mar. 29	Apr. 2	July 2		Nov. 20		
29	do	37 20	1,200	SE.	do	1903	6	Mar. 26	Apr. 8	Apr. 6	Apr. 10					
27	do	37 30	1,000	NE.	do	1902	5	Apr. 21	Apr. 24	Mar. –	Apr. 8		July –	Nov. –	July 10	
50	do	37 55	200	E.&W.	Sandy loam	1902	15	Apr. 17	Apr. 23	Apr. 9	Apr. 10		do	Oct. 30	July –	Aug. 30.
50	do	37 55	200	E.&W.	do	1903	16	Mar. 28	Apr. 2		Apr. 15		do		July 5	Aug. 1.
50	do	37 55	200	E.&W.	do	1904	17	Apr. 20	Apr. 25	Apr. 6	Apr. 25		July 10	Sept. 7		
50	do	37 55	200	E.&W.	do	1905	18	Apr. 9	Apr. 14	Apr. 19	Apr. 14		do	Oct. 22	July 10	Aug. 1.
50	do	37 55	200	E.&W.	do	1906	19	Apr. 15	Apr. 25	May 11	Apr. 25		do	do		Do.
35	do	38 30	400	NE.	Red clay	1902	4	Apr. –		Apr. 15	Apr. 15	Aug. 24				
35	do	38 30	400	NE.	do	1903	5	Apr. 7	Apr. 12	Apr. 5	Mar. 28	Aug. 1	June 29	Oct. 18	June 21	July 27.
35	do	38 30	400	NE.	do	1904	6	Apr. 27	May 6	Apr. 23	Apr. 7	July 12	July 18	Sept. 23	June 23	Aug. 6.
35	do	38 30	400	NE.	do	1905	7			Apr. 20	Apr. 2	July 22		Oct. 13		

35	do	38	30	400	NE.	do	1906	8	Apr. 25	Apr. 29	May 10	Apr. 15	July 21		Oct. 11		
78	Delaware	38	45	50	None.	Sandy loam	1904	8	Apr. 29	May 4	Apr. 22	Apr. 12					
48	Virginia	38	45	375	SE.	Porous loam	1903	11	Apr. 8	Apr. 12	Apr. 5	Apr. 17	June 30	July 6	Oct. 25		July 25.
48	do	38	45	375	SE.	do	1905	13	Apr. 21	Apr. 23	Apr. 19	Apr. 21					
48	do	38	45	375	SE.	do	1906	25	Apr. 23	Apr. 26	May 11	May 1		June 30	Oct. 11	June 30	July 20.
48	do	38	45	375	SE.	do	1907	26	Apr. 27	Apr. 29	Apr. 20			July 20	Oct. 13		Aug. 15.
54	do	39	0	1,000	NE.	do	1904	10	May 3	May 9	do	Apr. 26					
54	do	39	0	1,000	NE.	do	1906	18	Apr. 26	Apr. 30	Apr. 24	Apr. 18	June 10	July 1		June 25	Aug.
76	Delaware	39	5	40	NE.	Sandy loam	1903	10	Apr. 11	Apr. 18	Apr. 6	Mar. 28	June 8	June 24			
76	do	39	5	40	NE.	do	1904	11	May 2	May 6	Apr. 21	Apr. 23	June 23	July 1	Oct. 28		
76	do	39	5	40	NE.	do	1905	12	Apr. 20	Apr. 24	Apr. 19	Apr. 3	June 9	June 30	Oct. 22		
74	do	39	10	70	None.	do	1902	10	Apr. 24	Apr. 27				June 25	Oct. 20	June 25	
73	do	39	10	100	N.	do	1902	10	Apr. 25	May 1		Apr. 13		do		July 1	
87	New Jersey	39	15	40	SW.	do	1902	10	Apr. 30	May 5		Apr. 24					
66	Maryland	39	20	75	N.	Clay loam	1903	6	Apr. 15	Apr. 24	Apr. 7	Apr. 9		July 6		July –	
65	do	39	20	75		Gravelly loam	1902	7	Apr. 23	Apr. 28		Apr. 1		June 28		June 28	
65	do	39	20	75		do	1903	8	Apr. 12	Apr. 22		do		June 26		June 20	
67	do	39	20	50	SE.	Sandy loam	1903	8	Apr. 9	Apr. 12	Apr. 6	Apr. 5		June 25	Oct. 26	July 5	
64	do	39	25	225	SE.	Stony loam	1905	15	Apr. 21	Apr. 26	Apr. 19	Apr. 19	Aug. 25	July 6	Oct. 19	June 25	
64	do	39	25	225	SE.	do	1906	16	Apr. 26	Apr. 30	May 10	Apr. 28	Aug. 30		Oct. 11		
60	do	39	35	75	SW.	Heavy loam	1902	10	May 1	May 4	May 28	Apr. 24	July 5	July 8	Nov. 15	July 8	
60	do	39	35	75	SW.	do	1903	11	Apr. 29	May 1	Apr. 20	Apr. 6			Nov. –		
60	do	39	35	75	SW.	do	1904	12	May 7	May 8	May 11	Apr. 30	June 30	July 25	Sept. 17		
79	New Jersey	39	35	90	NW.	Gravelly loam	1902		Apr. 24	Apr. 28	Apr. 15	Apr. 20		July 6	Nov. 15	July 6	
59	do	39	40	300		Clay loam	1902	10	Apr. 26	do	do	Apr. 15	July 1	July 15		July 1	
91	do	39	50					5	Apr. 30	May 1		Apr. 14	July 20	July 20		July 10	
82	do	39	55	50	W.	Sandy loam	1902	6	Apr. 27	May 3				July 15		do	
84	do	39	55	50	N.	Heavy loam	1902	25	Apr. 25	Apr. 30	Apr. 16	Apr. 20	Aug. 1	July 10	Oct. 10	July 20	
84	do	39	55	50	N.	do	1903	26	Apr. 18	Apr. 25	May 2	Apr. 1	July 25	July 15	Oct. –	July 15	
84	do	39	55	50	N.	do	1904	27	May 5	May 9		Apr. 25	July 10	July 4		July 4	
86	do	40	0	50	NW.	Loam	1904	20	do	May 7		do	July 15	July 1	Sept. 22	July 5	
86	do	40	0	50	NW.	do	1905	21	Apr. 29	May 4		May 8	July 1	July 15	Nov. –	July 1	
80	do	40	5	60	N.	Gravelly loam	1904		May 4	May 7	Apr. 24		June 1	Aug. 1	Oct. 10	July 10	
80	do	40	5	60	N.	do	1906	9			Apr. 6	Apr. 23	June 7	July 25		July 8	
80	do	40	5	60	N.	do	1907	12	May 5		Apr. 20	Apr. 8	June 28	July 15		July 6	
81	do	40	10	75	None.	Heavy loam	1907	16	May 3	May 8		Apr. 24		July 23	Oct. 21	July 13	
95	do	40	10	40	N.	Sandy loam	1904	10	May 7	May 10				July 11	Sept. 22	July 4	
98	do	40	30	600	S.	Red shale	1905	14	May 1	May 7	Apr. 16	Apr. 29		July –	Oct. –		
99	do	40	35	40	NW.	Sandy loam	1907	10	May 10		May 12	May 4			Oct. 5		
88	do	40	50	500	E.	do	1907	10	May 8	May 12	Apr. 25	May 14		Aug. 1	Oct. 10	Aug. 1	
104	do	41	0	600	None.	Clay loam	1905	3	May 6	May 10	Apr. 24	Apr. 26	July 5	Aug. 12	Oct. 22	Aug. 12	
104	do	41	0	600	None.	do	1906	4	May 9	May 14	May 11	do	July 4	July 25	Oct. 12	Aug. 1	
104	do	41	0	600	None.	do	1907	5	May 15	May 20	May 12	Apr. 29	July 7	Aug. 6	Oct. 25	Aug. 19	
101	do	41	10	550	SE.	Gravelly loam	1904	11	May 6	May 15	Apr. 23	Apr. 28			Sept. 22		
103	do	41	15	400	SW.	Sandy loam	1904		May 10	do	May 5						

TABLE IV.—*Phenological records—Apples*—Continued.

YORK IMPERIAL. Synonym: *Johnson's Fine Winter.*

Observer's number.	State.	Approximate latitude.	Elevation (feet).	Slope.	Soil.	Year.	Age of tree (yrs.).	Date first bloom.	Date full bloom.	Date last spring frost.	Date leaf buds begin to open.	Date terminal buds begin to form.	Date picked (first picking).	Date first fall frost.	Date fit for use.	Keeps until—
		° ′														
11	North Carolina	35 25	1,990	SE.	Porous loam	1904	20	Apr. 30	May 5	Apr. 21	May 10	June 15	Sept. 15	Oct. 24	Oct. 20	Nov.
10	do	35 30	2,875	SW.	Clay loam	1903	7	Apr. 6	Apr. 16	Apr. 28	Apr. 4	July 15	Oct. 28	Oct. 25	Dec. 10	Feb.
10	do	35 30	2,875	SW.	do	1904	8	Apr. 15	Apr. 28	Apr. 26	Mar. 25	July 4	Oct. 15	Oct. 16	Nov. –	Dec.
10	do	35 30	2,875	SW.	do	1905	9			Mar. 10	Mar. 28	July 10	Oct. 25		Nov. 20	Feb.
10[b]	do	35 30	3,500	SE.	Gravelly clay	1902	7	Apr. 22	Apr. 28	Apr. 15	Apr. 22	July 27	do	Oct. 5	Dec. 20	Do.
10[d]	do	35 30	4,500	SE.	Sandy loam	1902	12	May 1	May 6	Apr. 22		July 31	Oct. 20	Oct. 1	do	Mar.
10[d]	do	35 30	4,500	SE.	do	1903	14	May 5	May 18	Apr. 28	May 4	July 25	Oct. 15	Oct. 5	Dec. 1	Feb.
16	do	36 10	3,250	S.	Clay loam	1904	12	May 10	do	Apr. 21	Apr. 27	July 22	Oct. 10	Oct. 15	Dec. 15	Apr.
16	do	36 10	3,250	S.	do	1905	13	Apr. 20	May 1	May 16	Apr. 16	July 20	do	Oct. 20	do	Do.
47	Virginia	36 45	1,700	SE.	Black loam	1905		Apr. 15	do	May 1			Oct. 1		Nov. 20	Do.
33	do	37 0	5	None.	Sandy loam	1904	8	Apr. 23	Apr. 30	Apr. 20	Apr. 4	June 23	Sept. 5	Oct. 17	Oct. 10	Nov.
49	do	37 5				1907	11	Apr. 26	May 7	do	May 5		Oct. 6	Oct. 15	Sept. 25	Apr.
40	do	37 10	2,400	None.	Clay loam	1907	8	Apr. 12	Apr. 30	Apr. 8						
39	do	37 10	2,000	NW.	Dark loam	1902	10	Apr. 26	May 1	Apr. 18	Apr. 20		Oct. 10	Sept. 10	Jan. 20	Apr.
46	do	37 15	500	S.	Sandy loam	1903	16	Apr. 2	Apr. 6						Oct. 1	Mar.
38	do	37 15	2,170	NW.	Limestone clay	1902	13	Apr. 28	May 3	Apr. 18	Apr. 11		Sept. 25	Sept. 14		
24	do	37 20	1,000	S.	Red clay	1903				Apr. 5			Oct. 30	Oct. 30		
25	do	37 20	1,000	SE.	do	1905	18	Apr. 25	May 5	Apr. 15	Apr. 25	July 20	Oct. 20	Oct. 20	Nov. 15	Apr.
31	do	37 25	1,400	NW.	Gravelly loam	1902	6	Apr. 21	Apr. 24	Apr. 8	Apr. 21	July –	Sept. 25		do	
44	do	37 45	630	SW.	Loam	1904	12	Apr. 24		Apr. –	Apr. 10	June 15				
42	do	37 45	800	SE.	Clay loam	1903	20	Mar. 24	Apr. 15	Apr. 15	Apr. 25		Sept. 15		Dec. 15	June.
45	do	37 50				1906	20		Apr. 22	May 9				Oct. 10		
50	do	37 55	200	E.&W.	Sandy loam	1903	16	Mar. 30	Apr. 4		Apr. 5		Oct. –		Oct. 20	Mar.
50	do	37 55	200	E.&W.	do	1904	17	Apr. 20	Apr. 25	Apr. 6	Apr. 25		Nov. 1	Sept. 7		
50	do	37 55	200	E.&W.	do	1905	18	Apr. 10	Apr. 15	Apr. 19	Apr. 15		Oct. 1	Oct. 22	Oct. 1	Dec.
50	do	37 55	200	E.&W.	do	1906	19	Apr. 15	Apr. 25	May 11	Apr. 25		Oct. 20		Oct. 30	Do.
41	do	38 0	1,200	N.	Black loam	1903	19			Apr. 5	Mar. 26		Oct. 2	Oct. 15	Jan. 15	Mar.
19	do	38 5	900	S.	Red clay	1905	18	Apr. 15	Apr. 23	Apr. 19	Apr. 1		Sept. 1	Oct. 7	Sept. 1	
22	do	38 10	1,200	NE.	Gravelly loam	1907	20	Apr. 20	do	May 22	Mar. 29		Oct. 15	Oct. 9	Jan. 15	Mar.
23	do	38 10	1,400	NE.	do	1907	9	Apr. 23	May 1	May 18	Apr. 1	July 20	Oct. 8	Oct. 13	Dec. –	May.
53	do	38 25	1,400	W.	do	1902	16	Apr. 26	do		Apr. 15		Oct. 1			
53	do	38 25	1,400	W.	do	1903	17	Apr. 13	Apr. 22		Apr. 10		Oct. –		Dec. –	Feb.
53	do	38 25	1,400	W.	do	1905	19	Apr. 20	Apr. 28	Apr. 24	Apr. 11		Oct. –	Oct. –	Oct. –	Do.
53	do	38 25	1,400	W.	do	1906	20	Apr. 25	May 1	May 11	Apr. 15		Sept. 25			
35	do	38 30	400	NE.	Red clay	1902	15	Apr. 24	Apr. 27	Apr. 15	do	Aug. 20	Oct. 15	Oct. 22	Oct. 1	Apr.
35	do	38 30	400	NE.	do	1903	16	Apr. 12	Apr. 22	Apr. 5	Apr. 2	Aug. 4	Oct. 1	Oct. 18		Do.
35	do	38 30	400	NE.	do	1904	17	Apr. 30	May 6	Apr. 23	Apr. 8	July 29	Sept. 26	Sept. 23	Sept. 1	Do.

35	.....do.....	38	30	400	NE.	.....do.....	1905	18	Apr. 19	Apr. 26	Apr. 20	Apr. 3	July 18	.....	Oct. 13	.....	.....
35	.....do.....	38	30	400	NE.	.....do.....	1906	19	Apr. 22	Apr. 28	May 11	Apr. 11	July 26	.....	Oct. 11	.....	May.
48	.....do.....	38	45	375	SE.	Porous loam	1903	15	Apr. 8	Apr. 12	Apr. 5	Apr. 15	July 1	Sept. 15	Oct. 25	.....	Do.
48	.....do.....	38	45	375	SE.	.....do.....	1906	33	Apr. 27	Apr. 29	May 11	Apr. 30	.....	.....	Oct. 11	.....	Mar.
55	.....do.....	39	0	600	.....	Sandy loam.....	1907	14	May 1	May 9	May 9	Apr. 15	.....	Oct. 10	Oct. 10	Feb. –	Apr.
54	.....do.....	39	0	1,000	NE.	Porous loam	1902	14	Apr. 24	Apr. 28	Apr. 14	Apr. 18	June 15	Sept. 25	.....	Sept. 25	Late.
54	.....do.....	39	0	1,000	NE.	.....do.....	1903	15	Apr. 10	Apr. 22	Apr. 5	Apr. 2	June 10	Sept. 30	.....	Dec. 1	June.
54	.....do.....	39	0	1,000	NE.	.....do.....	1904	16	May 4	May 10	Apr. 20	Apr. 27	...do.....	...do.....	.....	Oct. –	May.
54	.....do.....	39	0	1,000	NE.	.....do.....	1905	17	Apr. 22	Apr. 28	Apr. 19	Apr. 10	...do.....	Oct. 1	.....	.....	.....
54	.....do.....	39	0	1,000	NE.	.....do.....	1906	18	Apr. 25	May 1	May 8	Apr. 19	...do.....	...do.....	.....	Oct. 1	Apr.
54	.....do.....	39	0	1,000	NE.	.....do.....	1907	19	Apr. 22	Apr. 27	Apr. 23	Apr. 3	June 15	...do.....	.....	Dec. –	June.
32	.....do.....	39	10	500	NW.	Clay loam.....	1905	11	Apr. 25	...do.....	Apr. 18	Apr. 7	June 18	Oct. 4	.....	Dec. 1	Mar.
32	.....do.....	39	10	500	NW.	.....do.....	1906	12	Apr. 30	May 4	Apr. 25	Apr. 20	June 15	.....	Oct. 15	.....	.....
37	.....do.....	39	10	600	NW.	.....do.....	1903	17	Apr. 20	Apr. 25	.....	.....	.....	.....	.....	.....	.....
72	Delaware.....	39	10	70	None.	Sandy loam.....	1902	7	Apr. 24	Apr. 27	.....	.....	.....	Oct. 30	Oct. 20	Dec. 1	Apr.
68	Maryland.....	39	10	550	S.	Clay loam.....	1906	9	Apr. 20	May 3	May 10	Apr. 19	.....	Oct. 1	Oct. 12	Nov. 15	Jan.
65	.....do.....	39	20	75	.....	Gravelly loam.....	1902	6	Apr. 26	Apr. 29	.....	Apr. 9	.....	.....	.....	.....	.....
65	.....do.....	39	20	75	.....	.....do.....	1903	7	Apr. 20	.....	.....	Apr. 2	.....	.....	.....	.....	.....
64	.....do.....	39	25	225	S.	Porous loam	1907	7	May 5	May 10	May 5	May 1	.....	.....	Oct. 17	.....	.....
63	.....do.....	39	30	150	N.	Clay loam.....	1907	20	May 1	May 6	May 12	Apr. 24	Aug. 6	Oct. 14	Oct. 15	.....	Apr.
58	.....do.....	39	35	300	S.	Limestone loam...	1906	20	...do.....	May 5	May 10	Apr. 25	.....	Oct. 1	Oct. 12	Nov. 1	May.
58	.....do.....	39	35	300	S.	.....do.....	1907	21	May 4	May 9	May 12	Apr. 28	.....	Oct. 25	Oct. 15	...do.....	Do.
62	.....do.....	39	35	500	E.	Loam.....	1905	40	Apr. 28	May 6	.....	.....	.....	Oct. 10	.....	Dec. 1	Do.
60	.....do.....	39	35	75	SW.	Heavy loam.....	1902	15	Apr. 27	May 2	May 28	Apr. 23	July 10	Oct. 5	Nov. 15	Sept. 1	Late.
60	.....do.....	39	35	75	SW.	.....do.....	1903	16	Apr. 29	...do.....	Apr. 20	Apr. 6	July 20	.....	Nov. –	.....	.....
60	.....do.....	39	35	75	SW.	.....do.....	1904	17	May 9	May 12	May 11	Apr. 30	June 30	Oct. 5	Sept. 17	.....	Late.
60a	.....do.....	39	35	125	SW.	Sandy loam.....	1902	35	Apr. 26	Apr. 28	Apr. 20	Apr. 22	July 12	Sept. 12	Nov. 15	Sept. 1	Do.
60a	.....do.....	39	35	125	SW.	.....do.....	1903	36	Apr. 23	...do.....	...do.....	Apr. 24	July 9	Oct. 3	Nov. –	.....	Mar.
60a	.....do.....	39	35	125	SW.	.....do.....	1904	37	May 2	May 9	Apr. 21	Apr. 29	July 5	Oct. 8	Sept. 17	.....	Late.
90	New Jersey.....	39	45	125	SW.	Gravelly loam.....	1907	10	May 4	May 10	...do.....	.....	.....	.....	.....	.....	.....
82	.....do.....	39	55	50	W.	Sandy loam.....	1902	6	Apr. 25	May 2	.....	.....	.....	Sept. 20	.....	Sept. 20	Dec.
84	.....do.....	39	55	50	N.	Heavy loam.....	1902	35	Apr. 27	May 1	Apr. 16	Apr. 20	Sept. 15	Oct. 1	Oct. 10	Nov. 20	Apr.
84	.....do.....	39	55	50	N.	.....do.....	1904	37	May 7	May 11	.....	Apr. 27	Aug. 10	...do.....	.....	Dec. 1	Mar.
86	.....do.....	40	0	50	NW.	Loam.....	1904	20	May 5	May 8	.....	Apr. 28	July 25	...do.....	Sept. 22	Oct. –	Late.
81	.....do.....	40	10	75	None.	Heavy loam.....	1907	12	...do.....	May 11	.....	Apr. 25	.....	Oct. 7	Oct. 21	.....	Do.
96	.....do.....	40	15	90	N.& S.	Clay loam.....	1904	10	May 10	May 16	.....	May 7	.....	Oct. 10	Sept. 17	Oct. 10	.....
96	.....do.....	40	15	90	N.& S.	.....do.....	1905	11	May 4	May 10	.....	Apr. 25	.....	Oct. 13	Oct. 18	Feb. –	Mar.
94	.....do.....	40	20	140	S.	Sandy loam.....	1903	37	Apr. 28	May 1	May –	Apr. 9	June 13	Oct. 10	Oct. –	Oct. –	Do.
94	.....do.....	40	20	140	S.	.....do.....	1904	38	May 6	May 11	.....	Apr. 30	July 16	Oct. 1	Sept. 20	...do.....	Do.
98	.....do.....	40	30	600	S.	Red shale.....	1905	14	.....	May 8	Apr. 16	Apr. 26	.....	Sept. –	Oct. –	.....	Do.
99	.....do.....	40	35	40	NW.	Sandy loam.....	1907	12	May 9	.....	May 12	May 1	Sept. 15	Oct. 15	Oct. 5	Oct. –	Apr.

PLATES.

DESCRIPTION OF PLATES.

PLATE I. (*Frontispiece.*) A well-kept Yellow Transparent orchard about 10 years old. Good cultivation has been given and the trees have made an excellent growth.

PLATE II. Wagons and packages used in handling summer apples. Fig. 1.—Wagon loaded with half-bushel baskets of summer apples for the Philadelphia market. This load consists of 149 baskets. The wagon is a common type used in New Jersey in the vicinity of Philadelphia for hauling apples, tomatoes, and other truck to market. Fig. 2.—Wagon loaded with seventy-three $\frac{7}{8}$-bushel baskets of summer apples ready for hauling to the railroad station. The wagon is a common type used in Delaware for this purpose. The manner of loading the baskets on the wagon is also shown.

PLATE III. Packing-house views. Fig. 1.—Exterior view of a packing house in Delaware. There are four doors, one on either side. Each door is numbered to facilitate in giving directions in regard to receiving and discharging fruit. A truck used in hauling fruit from the orchard to the packing house is also shown. Fig. 2.—Interior view of a packing house in Delaware showing a common method of handling the fruit in grading and packing summer apples. Covers are attached to the baskets before they leave the packing house.

PLATE IV. Typical summer-apple orchards. Fig. 1.—A Maiden Blush orchard in New Jersey, about 30 years old. The props under the trees are suggestive of the productiveness of this variety in this section. The orchard receives thorough cultivation and spraying. Fig. 2.—A Red Astrachan orchard in Delaware, about 25 years old. It has been well maintained. The trees are 36 feet apart. The branches nearly interlock in both directions.

FIG. 1.—WAGON LOADED WITH HALF-BUSHEL BASKETS OF SUMMER APPLES GROWN IN NEW JERSEY FOR THE PHILADELPHIA MARKET.

FIG. 2.—WAGON LOADED WITH SEVEN-EIGHTHS-BUSHEL BASKETS OF SUMMER APPLES GROWN IN DELAWARE, READY TO BE HAULED TO THE SHIPPING STATION.

WAGON AND PACKAGES USED IN HANDLING SUMMER APPLES.

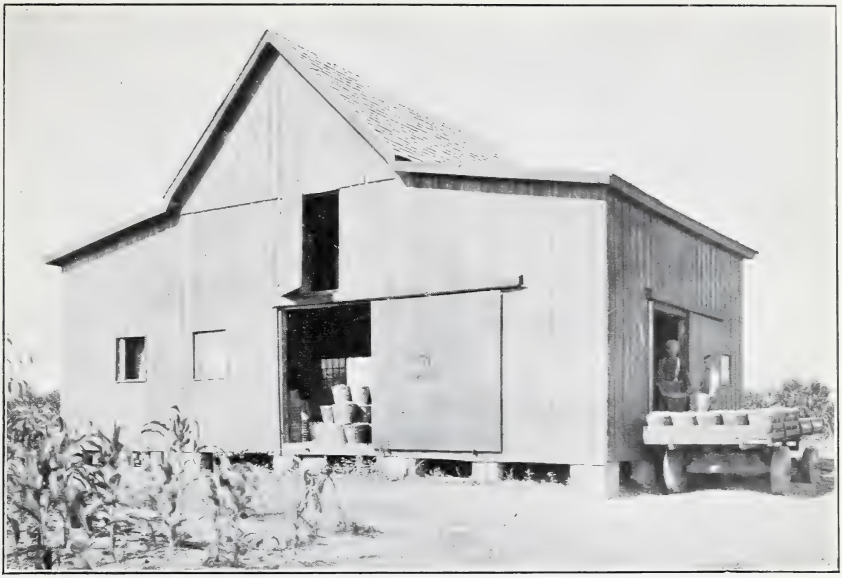

FIG. 1.—EXTERIOR VIEW OF A PACKING HOUSE.

FIG. 2.—INTERIOR VIEW OF A PACKING HOUSE, SHOWING A COMMON METHOD OF HANDLING THE FRUIT IN GRADING AND PACKING SUMMER APPLES.

PACKING-HOUSE VIEWS IN DELAWARE.

FIG. 1.—A MAIDEN BLUSH ORCHARD IN NEW JERSEY, ABOUT 30 YEARS OLD.

FIG. 2.—A RED ASTRACHAN ORCHARD IN DELAWARE, ABOUT 25 YEARS OLD.

TYPICAL SUMMER-APPLE ORCHARDS.

INDEX.

[Synonyms of apples are distinguished from the leading varietal names by the use of italic type.]

Page.

Altitude, factor in early-apple industry 23, 57–87
Apples, cooking, conditions of handling for market 20
dates of blossoming of different varieties 57–87
early, definition as to season of maturity 23
development of industry 7, 16–17
discussion of important varieties 23–48
factors affecting season of maturity 18
grading and packing for market 20–21, 90
growing for use 18, 19
handling the fruit 19–21
industry of the Coastal Plain region 16–18
less important varieties 50–51
markets 18–19, 22
methods of handling 19–20, 90
marketing 21–22, 90
problem of varieties 22–51
production, possibilities of the Coastal Plain region 18–19
promising varieties for trial 49–50, 51, 53
selection of varieties 22–23
selling the fruit 21–22
status and extent of industry 17–18
styles of packages 21, 90
summary of varieties 51–53
observers of phenological data 54–56
phenology, character of data 53–54
records 53–87
varieties, *Albemarle Pippin* 84
Alexander 23–24, 37, 52
Arkansas 57
Bachelor Blush 24, 52, 53
Baldwin 57–59
Ben Davis 59–61
Benoni 24, 52
Bibbing 24
Bietigheimer 24–25
Bonum 25, 52, 62
Borovitsky 37
Bough 25, 52, 62
Buckingham 25–26
Byers' Red 25
Cain 36
Cane 36
Carolina Red June 40
Celestia 26, 52, 53
Champlain 26, 52

Page.
Apples, varieties, *Charlottenthaler* 45
Chenango 26–27, 62
Codlin 36
Coffman 49, 53
Colton 27, 52, 62
Cooper's Early White 49
Cornell 27, 52
Cross 27, 53
Dawes 27–28, 53
Duchess of Oldenburg 23
Early Colton 27
Cooper 49, 53
Edward 28, 52
Harvest 28, 52, 63–65
Joe 28–29, 52
May 51
Ripe 29–30, 52, 65
Strawberry 30–31, 52
Edward Early 28
English Codlin 31, 52, 53
Equinetely 25
Fall Pippin 65
Queen 25
Fameuse 66
Fanny 31–32, 52, 66
Fourth of July 34
Gano 66
Garrettson 32
Geniton 73
Gibson's Vandevere 41
Glowing Coal 32, 53
Golden Sweet 32, 52
Government List No. 334 48
342 45
Grand Sultan 32
Gravenstein 33, 52, 67
Greasy Pippin 36
Grimes 67–68
Hagloe 43
Hawthornden 33, 53
Horse 33–34, 52
Jefferis 34, 52
Jersey Sweet 34, 52, 68
Johnson's Fine Winter 86
Jonathan 68
July 34–35, 52, 69
June 51
Kane 36, 53
Keswick 36, 52
King 79
Kirkbridge 36
Large Yellow Bough 25

Page.
Apples, varieties, Limbertwig 69
Lippincott 44
London Sweet 69
Lowell 36, 52
Magnum Bonum 25
Maiden Blush 36–37, 52, 70, 90
Mammoth Black Twig 57
Metz 37, 52
Milam 70
Mill Creek Vandevere 41
Muster 37, 53
Nero 71
Neverfail 73
North Carolina Red June 40
Northern Spy 71–72
Nyack 26
Pippin 26
Oldenburg 23, 37–38, 52, 53, 72
Orange Pippin 38, 52
Parry White 38
Porter 38–39
Primate 39, 52, 53, 73
Prince's Harvest 28
Ralls 73
Rawles Genet 73
Randolph 39–40, 52
Red Astrachan 23, 37, 40, 52, 74–75, 88
Bietigheimer 24
Cain 36
June 40–41, 52, 75
Vandevere 41
Roadstown 41, 52, 53
Rome Beauty 76
Roxbury 76
Sandbrook 41, 53
Sherwood's Favorite 26
Shockley 77
Smith Cider 77–78
Smokehouse 41–42, 52, 53, 78
Somerset Harvest 32
Sops-of-Wine 42
Starr 42, 52
Stayman Winesap 79
Strawberry 26
Summer Extra 50, 53
Hagloe 43–44, 52, 79
King 44, 53
Rambo 50
Rose 44–45, 52
Sweet Bough 25
Winter Paradise 83
Tallow 36

Page.
Apples, varieties, Tetofski 23, 37, 45, 52
Thaler 45, 53
Tompkins King 79
Townsend 45–46, 53
Trenton Early 46, 53
Unknown 39–40
Virginia Beauty 80
Wealthy 46, 52, 53, 80
White Juneating 51
May 51
Wax 38
Williams 46–48, 52, 80
Wilson June 50
Winesap 81–83
Winter Paradise 83
Woolman's Harvest 44
Yellow Newtown 84
Transparent 48–49, 52, 84–85, 90
York Imperial 86–87
Asbury Park, N. J., dates of spring frosts 16
Atlantic City, N. J., dates of spring frosts 16
Coastal Plain. *See* Plain, Atlantic Coastal.
Atmosphere, electrification and transparency, factors in plant growth 11
Baltimore, Md., dates of spring frosts 16
Blossoming of apple trees, phenological records 57–87
Boston, Mass., relation of market to early-apple industry 22
Chesapeake Bay, dates of spring frosts in region 16
early apples locally grown in region 52
Chestertown, Md., dates of spring frosts 16
Chicago, Ill., relation of market to early-apple industry 22
Cincinnati, Ohio, relation of market to early-apple industry 22
Climate, factors in growth of plants 11–12, 23, 57–87
College Park, Md., dates of spring frosts 16
Cooking apples. *See* Apples, cooking.
Cultivating, factor in growing apples 19
Delaware, dates of frosts 16, 58–78
features of apple industry 16–17, 53, 55, 58–78, 90
location of tidewater boundary line 8
Detroit, Mich., relation of market to early-apple industry 22
Diseases, fungous, methods of control in apple orchards 18, 19
District of Columbia, dates of spring frosts 16
location of tidewater boundary line 8
Drainage of the Coastal Plain region. *See* Plain, Atlantic Coastal, topography.
Early apples. *See* Apples, early.
Easton, Md., dates of spring frosts 16
Elevations in the Coastal Plain region. *See* Plain, Atlantic Coastal, altitudes.
England, markets for early apples 22
Evaporation, surface, relation to character of soil 11
Fertilizers, use as factor in growing apples 19
Foreign markets for apples. *See* Apples, early, markets.
Frost, factor in apple industry 11–12, 16, 19, 57–87
Fruit. *See* Apples.

Page.
Fungous diseases. *See* Diseases, fungous.
Geographical location of the Coastal Plain region. *See* Plain, Atlantic Coastal, geography.
Grading the fruit. *See* Apples, early, grading.
Hampton, Va., dates of spring frosts 16
Harvesting of early apples, methods 20
Hillsboro, Del., dates of spring frosts 16
Humidity, factor in growth of plants 11
Insects, methods of control in apple orchards 18
Introduction to bulletin 7-8
Kinston, N. C., climatological records 13
Latitude, approximate, locations of orchardists contributing phenological data 54, 57–87
Laurel, Md., dates of spring frosts 16
Liverpool, England, market for early apples 22
London, England, market for early apples 22
Markets for early apples. *See* Apples, early, markets.
Maryland, dates of frosts 16, 57–87
features of apple industry 17, 52, 53, 55, 57–87
location of tidewater boundary line 8
Maturity, factor in apple industry 18, 20, 57–87
Middle Atlantic States. *See* names of the several States.
Moisture, conservation, relation to character of soil 11
Moorestown, N. J., climatological records 15, 16
New England, relation of markets to early-apple industry 22
New Jersey, dates of frosts 16, 57–87
early apples locally grown 52
features of apple industry 17, 21, 53, 56, 57–87, 90
location of tidewater boundary line 8
peach trees of bearing age 16
Norfolk, Va., dates of spring frosts 16
North Carolina, dates of frosts 57–87
early apples locally grown 51, 52
features of apple industry 17, 53, 54, 57–87
location of tidewater boundary line 8
Observers of phenological data. *See* Apples, observers.
Orchard management. *See* Apples, early, growing for use.
Packing the fruit. *See* Apples, early, grading and packing.
Peaches, growing for market, relation to early-apple industry 7, 16, 19, 20
trees of bearing age in certain sections 16–17
Pennsylvania, location of tidewater boundary line 8
Phenological observers. *See* Apples, observers of phenological data.
records. *See* Apples, phenology.
Phenology, definition of term 53
Philadelphia, Pa., relation of market to early-apple industry 17, 21–22, 90
Picking by hand, method of harvesting apples 20
Pittsburg, Pa., relation of market to early-apple industry 22
Plain, Atlantic Coastal, adaptability of region to apple industry 18–19
altitudes 8–9, 10, 57–87
climate of the region 11–16, 57–87
description of the region 8–16
early-apple industry 16–19

Page.
Plain, Atlantic Coastal, geography of the region 8–9
soil of the region 10–11, 57–87
topography of the region 10
Plates, description 90
Precipitation, factor in growth of plants 11–12
records for typical stations 13–15
Princess Anne, Md., dates of spring frosts 16
Providence, R. I., relation of market to early-apple industry 22
Pruning of apple orchards, factor in culture 18, 19
Rainfall. *See* Precipitation.
Seaford, Del., climatological records 14
Slope of ground, apple orchards, phenological data 57–87
Soil, factor in early-apple industry 18, 23, 57–87
of the Coastal Plain region. *See* Plain, Atlantic Coastal, soil.
Solomons, Md., dates of spring frosts 16
Spraying, factor in growing summer apples 18, 19
Straw, use as mulch in apple orchards 20
Strong, W. C., on history of certain varieties of apple 23
Summer apples. *See* Apples, early.
Sunshine, factor in growth of plants 11
Temperature, factor in growth of trees 11–12, 57–87
records for typical stations 13–15
relation to earliness of maturity 18
Tidewater region. *See* Plain, Atlantic Coastal.
Topography of the Coastal Plain region. *See* Plain, Atlantic Coastal, topography.
Varieties of apples. *See* Apples, varieties.
Vineland, N. J., dates of spring frosts 16
Virginia, dates of frosts 16, 57–87
early apples locally grown 52
features of apple industry 17, 53, 55, 57–87
location of tidewater boundary line .....
Warsaw, Va., dates of spring frosts 16
Washington, D. C., dates of spring frosts 16
Wind, direction and velocity, factors in plant growth 11